Ebstein on Gout

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LONDON

J. & A. CHURCHILL

11, NEW BURLINGTON STREET

1885

PREFACE.

THE object of this treatise is almost entirely practical. It gives a description of the mode of living which I consider necessary not only for the actual victims of gout, but for those who have inherited a disposition towards the disease. Scientific questions are only entered on to the extent that is necessary to secure a foundation for my propositions. In the additions and explanations which are appended to the text, I have expanded and completed, in the light of further investigations, some questions which have been already discussed in my monograph on "The Nature and Treatment of Gout."

WILHELM EBSTEIN.

GÖTTINGEN, *December 20th*, 1884.

TRANSLATOR'S PREFACE.

I HAVE translated this little work at the request of Professor Ebstein, and while abridging it slightly in some places, have striven to omit nothing that might interest English readers. The decimal system, in which the weights and measures of the original are given, has been retained in the translation as being more suitable for comparisons of figures, but I trust the day is not far distant when we shall see this system universally adopted.

JOHN SCOTT.

MANCHESTER, *April 9th*, 1885.

THE REGIMEN TO BE ADOPTED IN CASES OF GOUT.

WHILE the question whether, and to what extent, the use of pharmaceutical remedies and the application of other methods of cure are of service in gout,(1)* has been a subject of the liveliest controversy for ages, and we are not yet in a position to say the final word on the subject, there has been for an equal period not the least doubt that a judicious method of living has a very powerful influence both in preventing the disease and in modifying its course. Knowledge of this fact was based, in the first instance, neither on purely theoretical hypotheses as to the causes and nature of gout, nor on the analysis of detailed clinical observations, but on the universal perception of the fact that gout, *cæteris paribus* (in the same country and amongst the same race), has a greater number of victims in proportion as strictness and simplicity of life have been abandoned in favour of luxury and effeminacy. As early as the first century after Christ, Seneca pointed out that the surprising increase of gout in Rome was a consequence of increased luxury in living, and adduced as sufficient proof the frequent occurrence of gout in the female sex. Women, in fact, who in his time were not behind men in licentiousness of life, were attacked by gout themselves; whereas in the time of Hippocrates, when they lived a simple and modest life, they were spared its onsets. Aretæus of Cappadocia (60 or 90 A.D.), the greatest physician since the

* These figures relate to the additions and illustrations at the end of the work.

time of Hippocrates, in his model description of the symptoms and course of gout, still further developed the statements of Seneca as to its causes. But both by Aretæus and Cœlius Aurelianus (in the third century after Christ) stress was laid on the hereditary nature of gout, and the conviction gradually made its way that luxuriousness of life was not the sole factor in its production. The hereditary nature of gout is duly insisted on in the writings of Sydenham, Boerhaave, and Frederick Hoffmann. We read in Van Swieten's "Commentaries on Boerhaave's Aphorisms," that the gouty subject almost always begets gouty subjects; that hereditariness has actually a greater significance in the case of gout than in any other disease; and that he has observed boys afflicted with the same disease as their parents. Apart from Cadogan, who denied the hereditariness of gout, alleging that if this were the case all the offspring of a gouty person should suffer regularly and without exception from the disease, all other observers have placed hereditariness in the front rank of predisposing causes. There was really little need of Falconer's refutation of Cadogan, for, long before the latter wrote, precise ideas prevailed on the question of heredity. It was known that the grandchild of a gouty subject might be the victim of gout, the disease sparing the intermediate generation. J. Hutchinson communicated a matter of fact which is of importance in connection with the hereditariness of gout, namely, that an individual runs a danger of contracting gout in proportion as the gouty process is developed in the parent. Thus, the elder members of a family may escape the disease, whereas the younger, born at a time when the parent is more and more under its influence, may show traces of it very early. We may with confidence support the principle that hereditariness is at least as important a factor in the production of gout as is excess of eating and drinking combined with inactivity of life; for excesses we may avoid, but hereditary influences we cannot escape. Sir William Temple is perfectly right when, in his well-known work on "Health and Long Life," he says that the first condition lies in the strength of our race or the surroundings of our birth. The ancients have given concise expression to the same idea in their proverb, "Gau-

deant bene nati," as quoted by Temple; while in our own times we have a humorous appreciation of it in the saying, "We cannot be too particular in the choice of our ancestors."

But in speaking of the hereditary transmission of gout, we must remember that the disease does not show itself in all the members of a family, nor is it propagated from father to son, and thence to grandson, in a direct line. We must not, then, expect to find the symptoms showing themselves soon after birth, as we do in the case of syphilis. I have never seen any cases of congenital gout, and we know that the symptoms of gout, though somewhat more frequent than is generally supposed, yet are comparatively infrequent in youth. As a parallel example to those which I have mentioned in my book on gout, I may add one which I owe to the kindness of my colleague, Rosenstein, of Leyden. The case was that of a boy ten years old. This is the only case of gout at an early age that Rosenstein has observed in a very extensive clinical experience of the disease.

Gout is not infectious; still less is it contagious. For all that, contagion has played a certain part in the history of this disease. We read in Van Swieten's "Commentaries on the Aphorisms of Boerhaave," who was the first to defend the view of the communicability of gout, "I have observed that women of good family, who lead a regular life, contract gout from gouty husbands." That women under such circumstances do occasionally contract gout is certainly correct, but such cases are far from establishing the contagiousness of gout. Cases of this nature are much more easily explained from our modern standpoint, that even good family and the most regular life cannot get the better of an innate gouty disposition. Boerhaave's view, however, found a number of supporters. Joseph Von Quarin (1734–1814), body-physician to the Emperor, went so far as to produce observations showing that even dogs which shared the couch of a gouty master might contract the disease through the emanations from his body. In the course of time the belief in the contagiousness of gout gradually wore out. In more recent times, Von Vering is the only one whom I have found maintaining that gout may be com-

municated through perspiration, clothes, or the occupation of a common bed. Yet in the Prussian Sanitary Regulations of 8th August, 1835, we find gout classified as a contagious disease, along with bad forms of scab of the head, cancer, and consumption. In the case of gout the beds used by the patients had to be disinfected, and articles of clothing, including stockings and boots, to be destroyed. As this regulation is still in force, this short *excursus* may be of service in reminding us of its existence, although from our modern point of view it is a mere curiosity.

Still more recently a further etiological factor has been adduced as giving an impetus to the origin and development of gouty symptoms, viz., lead-poisoning. A satisfactory conclusion is still far from being attained on this point; for, granting that in those lead-workers who suffer from uric acid gout we cannot, as a rule, look to heredity, much less to luxury of life, for the explanation of the gouty process, yet the scientific material at our disposal will by no means prove that lead-poisoning alone (*i.e.*, without the presence of a disposition to gout,(2) which we shall soon subject to closer examination) can develop the gouty process.

We have accordingly, up to this point, learnt to recognize only two factors as of importance, viz., heredity, and luxurious living combined with idleness. The first alone was recognized as a determining cause by single observers such as Cullen and Hamilton. But as we can have no prophylactic measures against heredity, these must be confined to warning gouty patients against all excesses, and inculcating upon them exceptional moderation and abstinence. This precept we meet with in all directions, both old and new, as to the mode of living to be adopted by the gouty. It came to be seen that the ultimate cause of gout could not consist merely in luxurious living, for it was found that people occasionally suffered very severely from the disease, although they were anything but luxurious in their living, and might even be distinguished for activity and industry ; and in the second place, numerous persons could be seen leading a life of luxury without ever suffering from gout. Hence commenced a search for the ultimate cause of gout. How long a search it

has been! and what is there that has not been blamed for the gout? (3) The outcome of these endeavours was a number of special prescriptions on the mode and scheme of life, by means of which the ultimate cause was supposed to be conquered. These prescriptions underwent manifold modifications and changes according as the views of individuals changed about the ultimate cause. No real advances were made in scientific knowledge. An exaggerated specialization was in vogue, which, starting from unsound premises, never hit the right path, and too often neglected the interest of the patient in vain contests over the *materies morbi*. Along with a special anti-gout diet, numerous pharmaceutical and other remedies were employed to neutralize the gouty poison. It does not lie within the compass of this essay to expound these, or to follow their historical development; but it may be of interest to make a few remarks on the treatment of gout by so called *secret remedies*, the more particularly as in a disease like gout, which is characterized by a chronic course and lengthened remissions, a wide door is opened for quackery and unscrupulous puffing. A system of puffing may indeed vindicate itself by producing cases where favourable results have been obtained by the remedy employed; but it is unfortunately too easy for it to plume itself with results that are not to be ascribed to the remedy, and it is easy enough to fool credulous patients. This charlatanism is not a product of our time, but even centuries ago boldly raised its head under the mask of science. In the middle of the seventeenth century, when the tartarus of Paracelsus (1493–1541) was still regarded as the final cause of many severe illnesses—when this *saline earthly entity*, which Paracelsus called tartarus, "because wherever it penetrates it burns with hellish pains," was considered to be the product of defective digestion, and more particularly to be the *materia peccans* of gout—J. Zipffell, of Leipzig, advertised his remedy for gout. This he did in a book dedicated to John George, second Duke of Saxony, Jülich, Cleves, and Berg. His "Medicamentum Antipodagricum" was "a spirit warranted to seize, resolve, and precipitate the *Materia Tartarea*, to carry off and out the disease bit by bit, and all for hard cash." A worthy

companion to this same gentleman was M. Le Febure, of Rochelle, who asserted that, through the grace of God Himself, the remedy for gout had been revealed to him; but he was very anxious to dispose of the revelation for a pecuniary consideration, as his book on the subject (1720) shows.

Coming nearer to our object, which is to establish rules for the guidance of those who suffer from gout, or who are predisposed to it, we shall best fulfil our task by looking at the subject from two points of view. (1) We must sift entirely the results of medical experience; and (2) we must bring our scientific knowledge of the nature of gout to bear on its therapeutics and prophylaxis. In this last respect we stand upon firmer ground than our predecessors, and however many gaps there may be in our knowledge, yet we have enough of it to give us many a useful hint. Even although here, as in so many other domains of medicine, our advances in scientific knowledge are not accompanied by corresponding advances in remedial measures, yet it would be a great mistake to undervalue our knowledge. It is only by keeping our eyes steadily fixed on the goal we wish to reach that we shall ultimately find the means of attaining all that may be possible; for in gout, at any rate, we ought not to trust to any lucky chance putting us in the way of discovering specific remedies.

We look nowadays for the *materia peccans* of gout in uric acid. It was a long time, however, before this knowledge became widely disseminated. After the investigations of Wollaston, Tennant, and Fourcroy, towards the end of last century, had already shown that gouty concretions contain uric acid, and when the notion was not far off that there might be a bond of union between gout and uric acid, C. Scudamore, in his well-known and serviceable book, published in the second decade of this century, maintained that gouty concretions occurred so seldom and in so few individuals that it was impossible to build a theory upon them, still less to look for the ultimate cause of gout in them. The sure natural basis was again abandoned, and vague unripe theories, which would not ally with definite conceptions, took its place. Thus we see S. A. Turck putting forth the view that gout

was founded on galvanic life, and had its origin in a morbid electro-chemical process; and Reichel, a physician attached to the baths at Steben, starting from analogous considerations of the polarity of mineral waters, sought to bring into vogue his galvano-electric chains of pure gold ore. Meanwhile even investigators of repute could not reconcile themselves to the uric acid theory. The want of actual data as to the influence of uric acid upon gout, and the complete stagnation of pathological investigation in this respect, explain to us how Henle, in 1847, regarded the deposition of uric acid as something accidental, and sought for the origin of gouty inflammation in an internal, perhaps central, affection of the nerves. Henle thus championed views in his time which have again been revived by Duckworth and others, even at the present day, when we are in the possession of new and weighty facts pointing to the influence of uric acid upon gout. The latter observer regards gout as a tropho-neurosis, which is either primary and congenital, or secondary and acquired through a blood-poisoning; but, as a matter of fact, I maintain that all the nervous symptoms which are observed in gout are to be regarded not as causes, but as consequences of the uric acid.

It is incomprehensible to me how any one can ever again fall back on such unsatisfying theories as these.

We owe an actual advance in our knowledge of this subject to A. B. Garrod, who, in his work on Gout, in 1859, was the first to show that urate of soda is present in abnormal quantity in the blood of gouty patients. Still, highly as we must estimate the proof given by Garrod, there was not enough of material brought forward to satisfy the demands which Henle, in his "Rational Pathology," had justly required as a preliminary condition for a physiological history of gout. From the facts adduced by Garrod, the conclusion could not really be drawn that the symptoms of gout are a *necessary* consequence of uric acid, *i.e.*, really come into existence under its influence. With the view, therefore, of working out a physiological history of gout, I published my monograph on "The Nature and Treatment of Gout," in which I endeavoured to establish the proof that *uric acid is a chemical poison*, which can cause not merely inflammatory

but also necrotizing and necrotic *processes in animal tissues.* I succeeded in establishing, by anatomical investigation of gouty organs, that the only typical appearance in gout was that of elements undergoing necrosis or already necrosed. These were found by me not merely in the hyaline joint-cartilages of gouty subjects, and in the rest of the so-called connective tissues (I examined the fibro-cartilages, the tendons, and the loose tissue beneath the skin and between the muscles), but also in the kidneys. Among the manifold anatomical changes which may be induced in the kidneys by gout, this was recognized as the only actual and characteristic appearance. The formation of these foci of necrosing and necrosed elements follows directly from the fluid parenchyma being exceedingly rich in neutral urate of soda, and stagnating in the affected parts. The separation of crystallized urates in the affected tissues is the secondary process, and only follows after the tissue has been completely destroyed by the uric acid. This deposition of the crystallized acid combinations of uric acid does not follow, in my opinion, from the fluids undergoing an alteration of their reaction in gout, in consequence of which the neutral urates would be changed into acid—for in that case we should constantly see these depositions in very many places of the gouty organism,—but simply from the fact that through this local necrosis an acid reaction ensues of the affected tissues, in which the neutral, easily soluble uric acid combinations circulating in the blood are changed into the less soluble acid salts of uric acid, or even into uric acid itself. This change is an easy one, because the combinations of uric acid with the alkalies are very unstable. In the typical gouty foci that arise in this way—that is to say, necrosed tissue with deposition of crystallized urates, or ultimately of uric acid itself—calcareous salts may be subsequently deposited, just as in other dead tissues. In the neighbourhood of the typical gouty foci there is generally developed early a reactive inflammation of greater or less extent. Matters may remain permanently in this condition—that is to say, no urates are deposited—if the uric acid accumulation is too insignificant to cause necrosis of the tissues.

In order to establish the deleterious effect of uric acid upon

the tissues, I found it necessary to have recourse to experiment, for the foregoing results, though based on anatomical investigations, were always open to the objection that the deposition of uric acid was accidental and non-essential, while the real cause of the disturbance of the tissues might be some nervous cause, tropho-neurotic or otherwise.

Experiments were accordingly made upon birds, healthy cocks being selected for the sake of convenience. The principal object of the investigation was to ascertain the results of ligature of the ureter in these animals. I may expressly state that these experiments were not undertaken with the intention of producing artificial gout, but merely to show the extremely pernicious effect of accumulation of uric acid upon animal tissues. By the ligature of the ureter, retention of the urine—which in birds is composed almost exclusively of uric acid—is produced, and we are enabled to produce with certainty in different tissues and organs of these animals, as in the liver and heart, tissue-changes which are analogous to the gouty accumulations observed in human organs. There are developed, for instance, as the result of ligature, not merely depositions of uric acid salts in the tissues and organs of animals experimented on, but necrosis can be demonstrated everywhere that the crystallized deposits are formed. Besides this, there is set up a more or less extensive reactive inflammation in the neighbourhood of these experimentally-produced tissue-changes. It did seem surprising in these experiments that in the kidneys of these animals, in which accumulation of uric acid was specially marked after the ligature, these necrosed patches should be wanting. If we look at this fact from the teleological point of view, it is not unreasonable to suppose that healthy kidneys have a greater power of resistance than other organs to the deleterious influence of uric acid. A further series of experiments seemed to show that this hypothesis borders upon certainty. Instead of tying both ureters of the birds, I procured complete retention of the uric acid by destroying the secreting epithelium in the *tubuli uriniferi* of the *cortex*, and the result was that I was able to demonstrate extensive depositions of crystallized urates, and eventually of uric acid, even

in the kidneys of these animals. We possess such a means for the destruction of the renal epithelium in the subcutaneous introduction of chromic acid salts. These poisons penetrating to the secreting structure of the kidney, destroy it; and after this is done we see, even in the kidneys of birds, the development of patches such as were observed in the liver and other organs when the ureters were tied. These experiments show the correctness of the hypothesis that the healthy tissue of the kidneys in birds has a greater power of resistance to the action of uric acid than have, for example, the liver and muscular structure of the heart. But as against the significance of these experiments it might still be urged that, even although uric acid is, as we have observed, the chief nitrogenous waste product in birds, yet there may possibly be other substances present in the urine, which, in spite of their insignificant quantity, may interfere with the nutrition of the tissues. Furthermore, it might be objected that in the organism of these animals, damaged, as it was, by the ligature of the ureters, or by the subcutaneous injection of chromic salts, additional pathological processes might be at work causing inflammation and necrosis. There was nothing for it but to seek for the means of overcoming these objections. The way was clearly indicated. I had to find out whether even chemically pure uric acid and its combinations with soda in the gouty foci displayed toxic qualities against animal tissues. By using pure uric acid and its soda salt I succeeded in constantly producing infiltration in the cornea of a rabbit's eye. Similar experiments with urea, xanthine, guanine, kreatine, kreatinine, and hippuric acid produced no results, and there were equally no results in my control-experiments with 5 per cent. solution of sodium phosphate. It was thus proved that chemically pure uric acid and its solution in sodium phosphate have a highly pernicious influence on the nutrition of certain tissues. Supported by these facts, we may therefore unhesitatingly assume that the gouty changes in the body are a *necessary* consequence of the uric acid.

Unfortunately, however, the development of the whole range of symptoms of gout in man cannot be pursued with the same exactitude as will enable us to prove that the

influence of uric acid alone is enough to elucidate the anatomical changes in the organs in uric acid gout.

I have in my work on Gout given my views on this question; and this much I think I may say, that the symptoms of gout can be easily, and indeed satisfactorily, explained through the hypothesis which I have set up.

I can here enter upon those views only in so far as they bear on the regimen and treatment of gout. An increased formation of uric acid in the human organism, as ascertained by the quantitative estimation of that secreted with the urine, does not give rise of itself to any typical attack of gout. Experience shows us this. We see in a series of cases of sickness the secretion of uric acid increased, not merely relatively, but also absolutely, especially as compared with the urea, and yet no gout is developed. If, then, the mere increased formation of uric acid is inadequate to elucidate the development of the whole range of gouty symptoms, it has been assumed that *retention** of the uric acid takes place. This can be brought about if the uric acid is not secreted in normal quantity by the kidneys, and in this way there is developed universal retention of uric acid—that is to say, an increased collection of uric acid spread over the whole body.

The widely circulated view of Garrod, that the kidneys are affected in this way, even in the milder forms and early stages of gout, is about as little proved as is his view that an attack of gout can be occasioned by the sudden remission of the uric acid secreting power of the kidneys, occurring, as this may, under the most diverse general disturbances, as, for example, under traumatic influences, or even mental emotions. Such a generalized retention of uric acid, caused by a disturbance of the uric acid secreting power of the kidneys, is not proved either by demonstration of increased uric acid in the blood—for this might occur through increased formation of uric acid—or by diminished secretion of the same through the urine, as urged by Garrod; for it is well known that the quantity of uric acid separated by the urine fluctuates, even in healthy subjects, within tolerably wide bounds, and may, as C. Neubauer's investigations show, sink as low

* Stauung—"a *stowing* away."

as ·2 gramme in twenty-four hours. Boedeker found the amount of secreted uric acid varying in eight healthy young men, under similar conditions of life, between ·3 and 1·4 gramme per diem. Apart from that, the mere fact of increased production of uric acid, with diminished separation of it by the kidneys, would not be enough to prove the retention of uric acid in the organism, for the total amount of uric acid that is formed in the body need not be secreted through the kidneys, but may undergo further changes in the organism. Garrod has himself assumed that accumulations of uric acid are occasionally destroyed in the bodies of gouty patients. After he had found, for example, that the serum from a blister over an inflamed gouty part contained no uric acid, he assumed that gouty inflammation had the property of destroying the uric acid in the blood of the inflamed part. It may further be noted that the statements of very trustworthy observers vary much as to the secretion of uric acid in gout. Scudamore was impressed with the excessive formation of uric acid and urates in the urine of gouty patients. Garrod, on the contrary, maintained that he observed the secretion of uric acid to be under the normal in the different periods of gouty derangement. He said that such was the case during the acute attack, during chronic ailments of the joints, and at last at a time when all gouty symptoms were absent. Lehmann, Ranke, Bartels, and Von Mering published analogous observations. Bouchard stated that the subjects of gout passed an increased quantity of uric acid (from ·4 to 1·5 gramme in twenty-four hours) in the intervals of remission. Bouchard observed a diminution of the secretion in solitary cases of gout in which there was, at the same time, interstitial inflammation of the kidneys; and he observed the same in cachectic gout. Even during the acute attack Bouchard observed no diminution of the secretion of uric acid. Lecorché, in his observations, came to results agreeing with those of Bouchard, and differing from those of Garrod. Lecorché admits, as a matter of fact, that there is a certain diminution of the secretion of uric acid in gout (on an average ·2 gramme in twenty-four hours), but he found, as against Garrod, that during the

gouty onset the daily amount secreted with the urine is increased to 1 gramme and more, and that it sinks again at the end of the attack, and averages ·57 gramme per diem. Observations of Michel also show that the secretion may increase during the acute attack. From these facts and considerations we may conclude that Garrod's theory of the retention of uric acid in gout cannot be maintained, and that his observations are contradicted by those of a number of observers equally trustworthy with himself. At all events, we may say that a derangement of the function of the kidneys is not an absolutely indispensable condition for the origin of the gouty attack. On the contrary, I am of opinion that in by far the majority of cases *the gouty process may be developed, and continue for a long time without the parenchyma of the kidneys being materially injured or in any way hindered in the exercise of its regular, healthy functions.* Still, I admit at once that there is a form of gout where *severe impairment of the kidneys is the starting-point of the gouty process.* I have distinguished this form of gout as *primary kidney gout.* This form shows, along with other grave tissue-changes, a greater or less degree of general uric acid retention, in so far as the uric acid cannot be secreted in sufficient quantity through the kidneys. Death generally ensues much earlier here, before extensive gouty changes take place in the cartilages of the joints. Hence it follows that the post-mortem shows the most advanced forms of gouty kidney, with greater or less deposition of crystallized urates, while the joints are completely free from every gouty change. In this severe form of gout, which I have described in my book on Gout (p. 157 of the original), and to which possibly individual dispositions co-operate, the kidney affection is so prominent, that in treatment we fix our eyes not so much on the gout as on the inflammatory process in the kidneys. This variety need not detain us, the more especially as we are only concerned with regimen. I content myself here with the statement that even in this form the general dietary given for primary articular gout would seem to be the most suitable. Fortunately, too, the number of these cases is apparently small, as contrasted with those which I denominate

primary articular gout, and which have therefore much greater practical interest for us.

In primary articular gout matters are exactly the reverse of what they are in the first variety. We have here to deal with cases of gout in which we find the most violent gouty impairments of the joints, skin, and subcutaneous connective tissue in the form of gouty nodes, without the slightest renal symptoms showing themselves during life, and in which even the autopsy shows the kidneys to be occasionally perfectly sound. In order, however, to elucidate these cases, we certainly do not require to assume, with Garrod, that the uric acid secreting power of the kidneys is diminished. Such cases may be explained by the assumption of a *localized retention of uric acid.* This assumption fits the actual facts of the case, and may be more correctly expressed as a *limited retention in definite parts of the body of the fluids overladen with uric acid combinations.* I am of opinion that this localized *uric acid retention* (I shall, for the sake of shortness, use this expression) is generally caused by the fact that the uric acid built up in the affected parts themselves is detained in the small vessels and lymphatics in its passage in a centripetal direction. It appears to me necessary to accept it as true that the formation of uric acid goes on of itself in the peripheral parts of the body (the muscles, and medulla of the bones), and that it is the retention of this which causes the attacks of gout. In this way we can explain the symptoms and course of this primary articular gout, which is by far the most frequently occurring variety. There is thus in gout, as I take it, a formation of uric acid going on in all the muscles and in the marrow of all the bones, which, proceeding from this apparently reversed origin, reaches the capillaries and general vascular system. I have attempted to demonstrate this in my book on "The Nature and Treatment of Gout," (4) and I shall here simply add some remarks elucidatory of the pathogenesis of this primary articular gout. Let us assume that everywhere in the body of the gouty—that is to say, in all their muscles and in the medulla of the bones—uric acid is formed; then if any hindrances to the circulation of the fluids occur, such hindrances will show themselves, *cæteris paribus*, soonest

and easiest in those parts of the body which are generally distinguished by slowness of the circulation—and this means chiefly in the most peripheral parts of the body. Seeing, then, that the *vis a tergo* fails to exercise its due weight sooner in the under than in the upper part of the body, the reason is plain to us why the finger-joints, the lobe of the ear, the point of the nose (the "copper-nose" of the gouty), as a rule, are much later affected than the joints of the foot and toes, especially the joint between the first and second phalanges of the great toe, and the metatarso-phalangeal joint of the same toe. If it is correct, and we may accept it as proved, that these last joints are almost always first and most frequently affected by gout, there can be no doubt that there are mechanical influences at work which explain the preference of gout for them. On this point I may say that Henle, at my solicitation, again directed his attention to the subject, but could not succeed in finding any specially disposing cause in the *construction* of these joints. Nor can badly made shoes be blamed for the phenomena, although G. H. Meyer certainly points out that the disfiguring and painful inflammations and swellings of these joints, which result from badly constructed shoes, certainly induce a *locus minoris resistentiæ* for the gouty process. Here we bring into view the importance of a factor which in many ways underlies the localization of gouty inflammations. Experience has taught us that everything which promotes the circulation of the fluids of the body hinders the development of gout; while everything that restrains, disturbs, retards, or arrests the circulation, gives an impetus to the gouty process. One of the most convincing proofs of the justice of this principle is an observation made by Charcot. In making a post-mortem on the body of a woman forty years old, who had suffered from hemiplegia, he found the majority of the joints on the paralysed side of the body infiltrated with uric acid salts. This fine observation is explained easily, and in entire conformity with natural conditions, by the fact that in the paralysed limbs, owing to the want of muscular influence on the circulation, a localized retention of uric acid took place on the principle explained above. The assumption

in this case, that somehow, owing to the withdrawal of nervous influence, uric acid was formed only in the paralysed parts, must be rejected for many reasons; this, amongst others: that in the kidneys also of the woman traces of urate of soda were found.

These preliminary remarks enable us to find our bearings, and construct for ourselves the development of an attack of gout in the great toe. It may go on somewhat in the following way:—In a gouty individual, as uric acid is developed in all the muscles and bones of the body, it is developed, as a matter of course, in the muscles of the foot and in the medulla of its bony framework. This anomalous tissue-change may go on without any symptoms, or eventually may produce slight discomfort. If, however, from any reason there is a retardation of the circulation—and this might receive an impetus, I think, from an increase of uric acid in the fluids—then evidently all the consequences ensue of the retention of fluids containing uric acid. If it were a question in gout of the retention of merely normal fluids, we should simply have ordinary œdema, constituting a painless, circumscribed, watery swelling; but as a material containing uric acid is accumulated, the consequence is the typical gouty attack, *i.e.*, an *aseptic* inflammatory process. This runs its course with severe pain in the affected parts, and redness, swelling, and tightness of the surrounding soft parts. In these cases there remain as signs of the œdema, especially in remitting inflammations, pittings on pressure, which are characteristically long in rising again, and the local inflammation ends with subsequent desquamation. The inflammation ceases as soon as the deposition of uric acid relaxes and the disturbance in the circulation is removed. Such an attack, however, leaves behind it, in the majority of cases, lasting changes, chiefly in the cartilages of the joints, which result, in my opinion, is owing to the great narrowness of the minute vessels, as a consequence of which typical gouty foci are developed at a comparatively early period. Still, this is not the place to treat this subject exhaustively, or to go further into the matters which hang upon these questions. I must content myself on this head with a short exposition of some points in the clinical history

of gout. The process of gouty infiltration, after cases running their course through a typical attack in the manner described, will proceed more quickly in the affected individual in proportion to the intensity of exciting causes which give an impetus to the further development of gout. Amongst these we may reckon the principal to be luxurious living with slight bodily activity. More and more joints are attacked; more and more gouty deposits take place. This happens, *mutatis mutandis*, always in the same way. Uric acid circulating in increased quantity in the fluids produces affections of the blood-vessels and heart, and of the most diverse mucous membranes, organs, and tissues of the body. The kidneys, being the chief eliminatories of uric acid, are principally endangered; they are affected sooner or later generally even in the course of this primary articular gout, to which then the kidney gout is superadded as a secondary affection; and in proportion as the power of the kidneys to excrete nitrogenous waste products is thus injured, so do all the dangers naturally increase which threaten the life of the gouty subject.

While I may, as occasion serves, return in the following pages to individual points in the pathology of gout, I think it is now possible upon the basis of what has been laid down to get a nearer view of the task before us. This task is to elucidate the treatment of gout, and more particularly to bring under rules the mode of life that is most suitable for gouty patients. In my opinion, much more attention must be paid to the gouty disposition than is generally the case. Persons who suffer from gout should, at an early period, attend to the dietary and training of their children, and medical men can by intelligent prophylaxis be of much service in the instruction of people who are amenable to advice; for without predisposition we may say, as a rule, there is no gout. We may assume this from the fact that there are persons enough who, although they spend their days in the greatest luxury and comfort, and live in the most refined way, yet are never attacked by gout, while, on the other hand, moderate men, who are continually kept active by strict hard work, may fall victims to the worst forms of gout; and this is often observed in the case of men who

have to struggle constantly with need and poverty, and never have the slightest taste of the enjoyments of life. This plainly depends exclusively on the strength of the predisposition to the disease, which of itself gives us the clue why the same measures which, *cæteris paribus*, proved useful with one patient are of little or no use with another, and also explains why persons in whom the exciting causes of gout have never become operative, are yet attacked by the disease in so severe a fashion. That gout is hereditary is a dogma dating back to a very early period in the history of medicine, and has been taught as the result of irrefragable experience. Whether, and how far, this power of hereditary transmission can be weakened, cannot be settled with absolute certainty; but as Corradi, in particular, has tried to show from a series of cases, the study of the history of culture among nations leads us to the conclusion that through a series of generations long-continued moderation exercises a favourable influence on the frequency and course of gout in the later generations. In this respect to co-operate in the weakening of gout is the task and duty of every gouty person and every one disposed to gout who has children. Whether in this way gout may yet be completely exterminated, is a question which naturally cannot be answered *à priori*. In any case it follows from the facts already adduced, that the view propounded by Leube (in his work on the urine, published along with Salkowski) on the relation of uric acid to gout is not correct.

Leube attributes the production of uric acid in gout solely to the greater ingestion of nitrogenous food; he denies the existence in gout of an actual *uric acid diathesis*, on which in general he throws doubt, except perhaps in the case of leukæmia. But in the case of leukæmia we cannot speak of a definite diathesis or disposition of the individual towards increased production of uric acid. The individual only produces more uric acid because the organism is leukæmic. So far also as the views can be explained which are held as to the causes of the increased secretion of uric acid seen in many cases of leukæmia, all observers are agreed on this, that this increased secretion is due simply

to the leukæmic affection. *The increased secretion of uric acid in leukæmia is a product of this disease.*(5) The reverse is the case in gout. Here uric acid is not the consequence but the cause of the disease. Increased formation of uric acid, in so far as this is evidenced by its increased secretion through the urine, does not of and by itself alone constitute uric acid gout. This fact shows us at once that the abnormalities in the production of uric acid which happen in the case of gout must be special and peculiar. I look for these abnormalities in the circumstance that the gouty patient, in consequence of a congenital and generally hereditary predisposition, produces uric acid in his muscles and in the medulla of his bones. As it has not been proved that the healthy individual produces uric acid in these tissues, I regard this phenomenon in gout as the production of uric acid in an anomalous* situation. This congenital disposition is peculiar to the gouty and to all who suffer from the uric acid diathesis. This anomaly is hereditary; it is not the product of a definite organic or systemic affection, but it consists of a peculiar disposition of tissue-change, and this we denominate a *diathesis*. This diathesis may be aggravated by certain exciting causes, but so far as we know cannot be produced by these alone. It would be possible indeed that in the case of leukæmia the impairment of the medulla of bone might also have a part in the increased uric acid production; but at all events the part would not be a great one, otherwise this disease would associate itself with articular gout. At any rate, in those cases of leukæmia where the affected medulla of the bones produces uric acid, there is this difference from gout, that in the latter disease the medulla does not show a leukæmic affection, and only in rare cases a gouty one. In the case of gout we have thus to deal with an increased formation of uric acid, as we have this formation occurring both in its usual position and in anomalous sites. I thus define the uric acid diathesis in gout as an increased uric acid production in consequence of a perhaps invariably inherited predisposition which seems actually to consist of a reproduction of uric

* *Perversem.*

acid in anomalous sites,—in the muscular tissue and in the medulla of the bones. If we grant that there is a peripheral formation of uric acid, the only point is to localize it in the proper tissues—the muscles and medulla of the bones,—for I think it is quite inadmissible to admit Cantani's view that the uric acid is partially deposited in the connective tissue. I regard the cartilaginous and other connective tissues as entirely, or almost entirely, paths for the fluids and supports of the tissues, but not as self-acting laboratories of tissue-change.(6)

The considerations laid down in the foregoing pages give us not merely a better understanding of the development of the gouty process, but show us also how important it is to direct our energies against the local retention of uric acid (as explained on p. 14), and to combat the other factors which help the development and advances of the gouty process. This is all the more necessary as we are not in a position to obviate thoroughly the disposition or diathesis that lies at the basis of uric acid gout.

How then shall we get nearer to the problems of the treatment of gout which present themselves to medical practice ?

We have come to this conclusion, that in primary articular gout we have not to deal with any retention of uric acid referable to its deficient elimination through the kidneys, but that we must accept the idea of an increased production of uric acid through its formation in anomalous positions, *i.e.*, in the muscles and medulla of the bones. The very first point, then, which we must aim at is to seek to procure a reduction of uric acid formation *in general*, for in this way we can affect the particular obnoxious production in anomalous sites.

As in so many things, here also practice has long outstripped theory. Before any definite idea had been formed as to the relation between uric acid and gout, the assumption was held that uric acid was responsible for the disease, and the efforts of physicians were directed to counteracting the supposed increased formation of uric acid. As it was supposed that this latter depended entirely on a defective method of nourishment, an attempt was made to settle the kind of subsistence

under the influence of which the least possible quantity of uric acid is formed.

This task is by no means a simple one. The first principle that must be laid down is, that no methods should be selected which produce bodily weakness and diminish the resisting power of the individual.

Naturally we have to deal here not merely with the *nature* but also with the *quantity* of the food to be allowed to the patients. As regards the nature of the food which will best combat the formation of uric acid, there has never prevailed amongst observers that unity of opinion which is desirable. Still, the researches of Lehmann, Bence Jones, and H. Ranke agree in this, that with an exclusive flesh diet, *cæteris paribus*, more uric acid is secreted than with a purely or almost purely vegetable diet. Although H. Ranke considered the influence of diet to be but slight, yet it exists, and on the principle that small things accumulate to great in course of time, we ought to hesitate before contributing in the slightest degree to giving an impetus to the formation of uric acid in the case of a person who has any disposition towards this increased formation. It is plain that different individuals comport themselves in different ways as regards this point, as is shown by the various results attained by observers. According to Haughton's researches, the daily amount of uric acid secreted by flesh-eaters as contrasted with vegetarians is on an average 4·5 to 1·5. From Ranke's experiments we have, at the same time, the important fact that the nature of the diet has less influence on the elimination of uric acid than it has on that of urea. We must conclude from the experiments of H. Ranke that the secretion of uric acid is increased by the ingestion of food, apart from the nature of that food. Nevertheless, without reference to the fact that exclusive flesh diet increases the uric acid secretion, this diet has so many other inconveniences and dangers for the human organism, that it must be specially renounced when there is a disposition to gout independent of it. On the other hand, purely vegetable foods, even though less uric acid may be secreted by their use, are unsuitable for many reasons as an exclusive means of support for persons in general, not to speak of gouty subjects in particular. Both

animal and vegetable foods after all contain the same materials, although in different proportions, and experience shows us that it requires a perfectly healthy condition of the intestine to digest purely vegetable diet. For this reason vegetarians themselves, who should on principle reject any food of animal origin, do not, as a rule, reject the use of milk, cheese, and butter. The intestinal canal in gouty patients is very susceptible to functional disturbances, and if we select a purely vegetable diet, the actual quantity of nourishment to be taken will be so great as to overpower the efforts of the bowel to manage it.(7)

The gouty patient then, as well as the healthy individual, ought to have a mixed diet composed of animal and vegetable foods. How is this diet to be arranged? On this point we have commands and prohibitions of the most diverse nature. It would take us too far to enumerate and criticise these; but in the case of the regimen recommended by Cantani it would be easy to show the defects which such dietetic prescriptions contain, in so far as they are founded on one-sided principles. I select Cantani's system because it has a great number of followers both in Italy and in Germany. None of these, however, so far as I have been able to see, have followed out Cantani's prescriptions for any length of time in their entirety. Cantani limits, as far as possible, the food of gouty patients to flesh meat, soup, eggs, fish in moderate, and vegetables in greater quantity. Of the last he allows simply salad plants, such as lettuce (garden salad), borage (*Borago officinalis*), dandelion (*Leontodon taraxacum*), chicory, cress (*Lepidium sativum*). Of these things, Cantani says, the patient must take just exactly as much as will satisfy his hunger. In another place he goes so far as to say that the patient should, as a rule, never fully satisfy himself. It is pretty certain that so distinguished a physician as Cantani saw some objections to this scheme, for he says himself, "It is clear that if we look at the human constitution in general, and the various tissues of omnivorous man, a one-sided regimen of diet, to the exclusion of so many known foods, however theoretically beneficial it may be, cannot be carried out in its entirety, for the patient would have difficulty

in enduring it." In practice we must be content with following without interruption these prescriptions in their full strength for some months. The exact time he gives in one part of his book as from six to twelve months. For the rest of the patient's life Cantani orders him to refrain, as far as possible, from using those articles of diet which do not suit the gouty tendency, but which man in general, as an omnivorous animal, cannot entirely do without. But on no account is the patient ever to indulge in any of those articles of food which are recognized as absolutely prejudicial in gout. So far Cantani. Amongst those things which Cantani recognizes as absolutely prejudicial in gout are the carbo-hydrates and fats. I agree with Cantani in restricting the use of the carbo-hydrates as far as possible. Under certain circumstances I forbid some of them entirely. To begin with, I may say that such restriction is necessary, for experience shows us that it is precisely under the influence of the carbo-hydrates that most severe forms of dyspepsia arise. Be then the bond between gout and dyspepsia what it may—let gout be the cause or the consequence of dyspepsia (I believe that in by far the majority of cases we have to deal with the latter state of affairs),—be these things as they may, the limitation of the carbo-hydrates in general forms a very important part of the treatment of one of the most important symptoms of gout; a symptom which as often as not will disappear under an alteration of the regimen in this direction. The articles which it is of most importance to limit temporarily, or better still permanently, are those which are distinguished by excess of starch, which is ultimately converted into sugar.

As regards fats the case is quite different. But before I enter upon this point, I must come back again to Cantani's prescriptions as given above. These would make the diet of gouty patients very offensive to them, by forbidding ingredients which are perhaps universally used in Germany and also elsewhere. Certain vegetables could not be used in the form of salads, for Cantani forbids his patients acids in general, and thus acid salads are excluded. Besides, as he holds milk, fat, and sweets in abomination, his patients cannot eat salads prepared with cream or bacon. No veget-

ables must be cooked with fat or olive oil. The wretched gouty patient who does not care for green salads or vegetables such as spinach, savoys, and white cabbage cooked with nothing but salt to make them palatable, is shut up for six months or a year to a diet consisting exclusively of moderate quantities of flesh, fish, soup, and eggs. He could certainly exist upon it; but there is a contradiction in allowing eggs and forbidding fat. Cantani drives a hole in his own principles. If fat is forbidden, egg-albumen, which contains only 5 per cent. of fat, may indeed be allowed, but not the yolk of eggs, which contains albumen, but principally fat to the extent of nearly 30 per cent. Accordingly it is precisely on account of its containing fat that yolk of egg has often been entirely excluded from the diet of gouty patients.

If we come back now to the question of the use of fat in gout, we shall find a firm principle prevailing up to now, that fat is not good for gouty patients. Remarkably enough we find in the older writers no special directions as to the use of fat, however detailed their injunctions as to diet may be. So far as I know, Scudamore is the first to speak out against fat. Pork, which he regards in general as indigestible, must be taken, if taken at all, without the skin and fat. Salmon, under all circumstances, he regards as unsuitable. Garrod is the most tolerant of fat, for he says, "Some small slices of fried bacon may be beneficial in many cases, if the lean part is put aside as too difficult to digest on account of its hard fibres."

Garrod quotes (*cf.* Literary Index, No. 22) a statement made by Boecker, who found that 85 to 90 grammes of butter taken daily had no influence on the secretion of water, urea, uric acid, or any of the urinary constituents. To justify the prohibition of fat reliance was placed on a series of experiments carried out by G. Meissner and R. Koch. From these it appears that when fat is taken, more uric acid is secreted than is normally the case. What really happens is that when fat is taken, under certain circumstances, succinic acid, and, along with it, greater quantities of uric acid in combination appear in the urine. These observers gave patients the ordinary diet, and then for two

successive afternoons gave half a pound of butter, and no results followed; but on the third day, the butter being still continued, the succinic acid, in combination with a base, showed itself in the urine.

I thought it would be useful to make some experiments myself as to how the secretion of uric acid was affected by moderate quantities of fat. A trustworthy healthy man, thirty years of age, was put under a diet containing fat in exactly known proportions. The urine was carefully collected and examined by Herr Jahns, apothecary to the university here. The determination of the uric acid was done in the usual way by treating the urine with muriatic acid, in the proportion of ·0048 to every 100 c.c. of the mixture of urine and muriatic acid. The quantity of uric acid dissolved by the water used to wash the filtrate was put against the colouring matter deposited, and not reckoned. The urea was determined by Liebig's method, as modified by Pflüger.

The diet used during the experiments was as follows:—

Morning: 400 c.c. coffee, 100 grms. white bread.

Mid-day: 300 c.c. soup, 125 grms. meat, 100 grms. potatoes, 100 grms. fruit, 100 c.c. wine, followed by 200 grms. coffee.

Evening: 300 c.c. beer, 100 grms. rye bread, 50 grms. meat.

In the course of the day 350 c.c. water.

The way the experiment was carried out, and its results, are given in the following table:—

No. of Experiment.	Date of Experiment.	Conditions of Experiment.	Quantity of Urine in 24 Hours.	Uric Acid in 24 Hours.	Urea in 24 Hours.
1st Series.					
No. 1	13th June	Diet as above	1,380 c.c.	·545 grms.	26·3 grms.
,, 2	14th ,,	The same+100 grms. butter	1,360 ,,	·412 ,,	25·3 ,,
2nd Series.					
No. 3	22nd ,,	Diet as above	1,990 ,,	·417 ,,	24·8 ,,
,, 4	23rd ,,	The same+120 grms. butter	2,170 ,,	·401 ,,	26 ,,
,, 5	24th ,,	Diet as above	1,710 ,,	·393 ,,	25·1 ,,
3rd Series.					
No. 6	3rd July	Diet as above	2,180 ,,	·425 ,,	25·6 ,,
,, 7	4th ,,	The same+150 grms. butter	1,480 ,,	·518 ,,	26·1 ,,
,, 8	5th ,,	Diet as above	1,380 ,,	·690 ,,	24·7 ,,

From these experiments this much may be gathered, that in a daily consumption of butter up to 120 grms. no increase of the secretion of uric acid takes place. If the prohibition of butter and fat in the regimen for gouty patients is based on the assumption that fat increases the production of uric acid, the statement cannot be justified as far as the secretion of the acid by the urine is concerned.

The butter was exceedingly well tolerated by the individual experimented on.

There is, then, no other ground for excluding fats from the mixed diet which we recommend in gout. All reasons which can be adduced against its allowance prove themselves weak; and weighty indeed must be the reasons which would justify us in rejecting so important an article of diet as fat. But there are a number of circumstances which show us that fat is a very valuable food in gout, always within necessary bounds, and with adaptation to individual circumstances.

This follows at once, if we consider the quantity of food that should be regarded as reasonable for a gouty patient. Sydenham expressed his views on this point as follows:— "Therefore moderation in eating and drinking is to be observed, so as on the one hand to avoid taking in more aliment than the stomach can conveniently digest, and of course increasing the disease thereby, and on the other hand defrauding the parts by immoderate abstinence of the degree of nourishment requisite to keep up the strength, which will weaken them still more; either of these extremes being equally prejudicial, as I have often experienced, both in myself and others." Sir William Temple says, in his treatise on the "Cure of the Gout by Moxa,"—"But that which I call temperance, and reckon so necessary in all attempts and methods of curing the gout, is a regular and simple diet, limited by every man's experience of his own easy digestion, and thereby proportioning, as near as well can be, the daily repairs to the daily decays of our bodies."

As regards Temple's recommendation that the individual experience of the patient should be taken into account, I grant at once that a certain amount of latitude should be

allowed to him in the quantity and choice of different articles of diet. We can do this all the easier, inasmuch as amongst gouty patients we find a very great number of them to be highly intelligent, and—the two things are unfortunately not identical, as experienced physicians can ratify—relatively a goodly number of men who are both intelligent and amenable to scientific instruction. But a *system of directions* is not merely desirable, but also necessary, in order to keep the patient, for example, from lasting injury inflicted by a course of diet which an apparent success might delude him into thinking was a useful one. The essential point of these directions is to secure the due nourishment of the patient without overloading his highly sensitive stomach. In this respect fat is excellent. Its power of checking hunger, known to Hippocrates, plays an important part. In my book on "Corpulence and its Treatment" I have gone more fully into this point. In any case the use of fat does not allay the feeling of hunger by spoiling the patient's appetite, and causing nausea or other dyspeptic symptoms; but, on the contrary, those forms of dyspepsia which are due to a diet over-rich in starchy foods are alleviated when part of the starch is replaced by fat. I have frequently, by this simple change in the bill of fare, seen obstinate dyspepsia, that had resisted every form of treatment, give way in the shortest time, and this, too, in gouty people. I grant that idiosyncrasies exist here as everywhere else, and that occasionally people are found who do not care for fat, or even good butter, to begin with, and who assert that they cannot bear these substances. In my experience such cases are very rare. I do not remember any such patient who for any length of time objected to good butter. But I may say that those persons who object to good fat as unbearable or unpleasant are very few compared with the great number of those who, in spite of their representations to the contrary, are forbidden fat by their medical attendants. Besides this, I have observed that where an idiosyncrasy against fat does exist, it is generally easily conquered in by far the majority of cases, especially if the patients observe that their prejudice was ill founded, and that their troubles get better under a diet in which fat has

a place. I consider that fats are only really contra-indicated in those cases which are developed in consequence of mechanical insufficiency of the stomach—that is, where the muscular elements of the stomach are insufficient to empty its contents into the bowel in the normal fashion. That fat is advantageous in diseases of the stomach is asserted by earlier unprejudiced observers. I may state that so prominent a clinical teacher as C. Bartels, of Kiel, refused to eliminate fat from the diet of patients suffering from dilatation of the stomach, an affection which certainly forms a fruitful soil for the development of dyspeptic symptoms. That fats of the best quality—and it is only such we should use both for the healthy and the sick—do not injure digestion is proved by physiological observations. The experiments of Frerichs in his classical work on digestion could only confirm the experiences of earlier observers, such as Tiedemann and Gmelin, Bouchardat and Sandras, Blondlot, Bernard and Barreswil, to the effect that fats suffer no actual change in the stomach, except that they are melted by the heat. C. A. Ewald has expressed himself in a like sense. Even though we accept as correct the statement of Ph. Cash, that the neutral fats are split up in the stomach into glycerine and fatty acids, yet physiological and pathological experience proves that no particular embarrassment arises from accepting the proposition.

In determining what fats are to be employed, regard must be had to individual circumstances. Furthermore, I may here remark that I have never seen disturbances of the alimentary canal arise from the introduction of an adequate quantity of fat into the diet of gouty patients; on the contrary, fat suits them very well: and I may say this much, that the gouty process seems to be anything but unfavourable to the absorption of fat. The carbo-hydrates, although playing, according to Voit, a similar important part in keeping up the condition of the body as regards albumen, ought to be reduced to a relatively small quantity, on account of their greater indigestibility, in all cases where the gouty patient is inclined to dyspepsia. As a matter of fact, they may be unhesitatingly set aside in favour of that quantity of fat which is

suitable to individual circumstances. Another point to notice is this:—We know that when hard work is required, a dietary into which fat enters is absolutely necessary. We shall see that we can give no better advice even to the gouty, and all of the gouty disposition, than to exercise their natural strength. A suitable ingestion of fat is by far the most appropriate and convenient method of enabling the patient to do that. The consumption, then, of a suitable quantity of fat being a point which was known, even in antiquity, to have a beneficial effect in satisfying the appetite of gouty patients, and in counteracting the tendency to excess, the next thing that is worthy of observation is, that there should be but scant choice in the details of the dietary.(8) The danger which the *variatio delectat* brings with it is a specially great one in the case of the gouty, for if they take in any degree too much even of the kind of food which is allowed them, they run against the principle of limitation which is of such importance in the treatment. The gouty individual stands in the first rank of those who must *eat merely to live.* If ever he found any pleasure in *living to eat* he must wean himself from it as soon as possible. Sweets apart, our gouty friend may be as ticklish as he likes, but he must never be a glutton. He must cease to eat as soon as the first feeling of satisfaction comes on; nor must he give way to the false appetite which comes on after this, and which if gratified brings him to the *non possumus* stage. Gouty people who lead a quiet life must have no second breakfast, and their dinner or principal meal should be taken between twelve o'clock and two. Supper should be moderate in quantity.(9)

The reader will see that these principles agree in general with those which I have prescribed for the corpulent; and as corpulence and gout go very often hand and hand, there is no difficulty in carrying out the treatment, but the same regimen will meet both indications. As a matter of course, gouty persons with a tendency to corpulence must be refused many things which a healthy fat man would be allowed to take. Amongst these things we may reckon many sorts of vegetables, such as cabbages and so forth. Whatever diet is used, it must be so adjusted and prepared as to give as little trouble

to the stomach as possible, and so be best adapted to the nutrition of the individual. Potatoes, in so far as they are allowed in general, and leguminous vegetables had better be prepared as *purées;* and meat must be scraped or grated, and lightly fried in butter, for those who have bad teeth. Patients must be strictly enjoined to eat slowly and chew well, and if their teeth are defective should provide themselves with artificial sets. By acting on these principles and prescribing certain changes, both quantitative and qualitative, adapted to individual cases, we shall be able to limit corpulence in those patients who are inclined to it. We shall also find this to be the best means of supporting gouty patients who are not corpulent, and of keeping up their bodily condition so far as the gout will allow. Unfortunately, gout often enough causes severe derangements of nutrition, and it is specially incumbent on the medical attendant to limit and avert such derangements by means of dietetic prescriptions, never, however, allowing himself to give any impetus to the gout by denying the patient what is absolutely necessary. I consider it to be a thing not at all permissible, and very bad practice, to attempt to subdue gout by starvation cures and such like methods of treatment, which simply lower the strength of a patient, who has dangers enough to combat without this. Every case must be treated according to its own individual merits, within the framework of the principles laid down here, and no attempt must be made to cut the treatment to a uniform pattern throughout. Where corpulence has to be reduced it must be done slowly. Those cures for corpulence which act quickly are particularly unsuitable in the case of gout.

As regards relishes, such as condiments in general, vinegar, &c., only that quantity should be taken which is absolutely necessary to make the food palatable. Dishes which require much condiment to make them acceptable ought, as a rule, to be entirely avoided. Apart from many other disadvantages which the unrestricted use of condiments entails, they produce direct irritation of the mucous membrane of the intestinal canal if they are taken in any quantity; and it is a primary indication with us to irritate the intestines as little as possible in cases of gout.(10)

Fruit, on the contrary, we may freely recommend to the gouty and those who have a tendency to gout.

Wöhler, relying on facts observed by himself, has taught us that the vegetable acids with alkaline bases become changed into carbonates in the animal economy, and in view of the disadvantages which are entailed by a prolonged use of the alkaline carbonates, he recommends as a substitute the vegetable acids. The use of these is justified by the fact that they are not only pleasant, but can be continued for a long time without injury to digestion. Such fruits, therefore, as cherries and strawberries, which contain an organic acid, can be taken with good results, and are less injurious to digestion than the alkaline carbonates. Wöhler mentions the so-called cherry cure, which enjoyed a special reputation in gout. He also takes notice of the strawberry cure, which was the means by which Linnæus cured himself of a long-standing gout. Similarly, other fruits may be employed with advantage. I recommend them as far as possible as an integral portion of the diet. But when the cure is confined exclusively to the use of fruits, as, for example, in the grape cure, we must be very cautious. Dyspeptic troubles are easily induced by such means, and the mischief thus wrought counterbalances any good that may be derived from the fruit.

As regards the question of drink, pure water is in general the best drink for any one, and gouty people are no exception. Sydenham is, perhaps, the only observer of note who regards the exclusive use of water as injurious, unless the patient has been accustomed to take nothing else from his youth. He forbids wine in gout, as being actually detrimental, and in this he runs counter to the proverb—"You may drink wine or leave it, but the plaguy gout sticks all the same."* Instead of it he recommends a thin hopped or unhopped London small beer.

As matters stand at present, not only do different observers differ in their views as to the use of alcoholic drinks, but even the best authors contradict themselves on the point.

* Man mag den Wein trinken oder meiden, so bleibt doch die Plage des Podagra. Compare the English — "If you drink wine you have the gout; if you don't drink wine the gout will have you."

It would be easy to show this by a series of examples, and thus point out the utter looseness of grip of such prescriptions. As Cantani makes no mention of the use of alcoholic drinks, he may be taken as regarding their exclusion as self-evident. I agree with him to this extent, that I would reject the use of alcohol in cases of gout, or of disposition towards gout, because experience shows us that alcohol aids the development of gout; but I must add this, *that in gout, as in all other diseases, the prescription of alcohol may become a necessity, and that we may eventually have, in spite of ourselves, to resort to it, evil though it be, in order to save our patient from greater evils.* Alcohol is a means of stimulation which no physician can afford to do without, even in gout. But I utterly forbid its use in the cure of robust patients suffering from gout. If they can do without it, however heavy the task to renounce it, it will be an unmitigated benefit to them. It is an absolute necessity for people with a strong tendency towards gout to do without alcohol. I grant that patients who are accustomed to good living, though they may willingly follow out other points of the treatment, yet may not at a bound give up their alcohol. Gradually, however, we shall succeed in attaining our aim in at least a fraction of these cases. Put it merely at 10 per cent., and we shall have done more good by our universal prohibition than if we had spoiled even these cases by half-measures. Alcohol is to be avoided not merely because of itself and by itself it produces gout, but because in the case of those who are disposed to gout, or who already suffer from it, it gives an impetus to the origination or the further development of the gouty process. This is proved to us infallibly by the results of medical experience. How much alcohol can be taken, or how long it can be enjoyed, with impunity, cannot be even approximately estimated by any one.(11)

If we are to regard water as the legitimate drink for gouty patients, the question naturally arises, should the patient drink much or little water? Cantani has specially recommended the ingestion of large quantities of water. The diet which I recommend discourages the ingestion of more water than is necessary to keep the body in its natural condition as

regards fluids. The more we adhere to the principles of diet laid down, the less necessity is there to call in the aid of water to wash out the disease. By a strict attention to this dietary the feelings both of hunger and thirst are appeased—a point on which I have laid stress in my pamphlet on "Corpulence and its Treatment."

A further reason that may have contributed to the recommendation of the abundant use of water in the treatment of gout, is the circumstance that it has been supposed to have a restrictive influence on the formation of uric acid. It would appear, from a series of careful experiments made by Genth, that increased imbibition of water not merely diminishes the secretion of uric acid, but even brings the secretion to the vanishing point. Beneke, too, although he considers Genth's method of estimating the uric acid to be defective, yet held that it was very probable that drinking great quantities of water reduced the uric acid in the urine. At the very least, however, this is not a constant result. At my instigation Herr Jahns instituted a series of investigations on this point, the result being that the imbibition of great quantities of water, up to 4,000 c.c. in the twenty-four hours, caused no diminution in the uric acid secretion. It is plain that there are here individual circumstances which are not at all easy to be seen through; and before proposing measures of this sort, which must have some effect on the system, we ought to be perfectly convinced that they will secure the desired effect. Quite apart from this, however, we must be certain that the object to be attained is of such value as to outweigh the concomitant disadvantages, for I consider it very undesirable to flood the vascular system for any length of time. Even if it were correct that drinking a deal of water reduced the elimination of uric acid, still we should have no proof that there was a diminished formation of the same in the system. As a matter of practice I have always found that my patients are much better when they do not interfere with that lessened feeling of thirst which is induced by the diet I have recommended. It is only when uric acid concretions are present that I consider a freer ingestion of fluids to be necessary, as I have shown more fully in my

book on "Urinary Concretions." In such a case I recommend that the patient should, instead of taking his usual coffee of a morning, have a weak infusion of black tea, taking the same at night also as usual.(12)

If the question is asked, from what date and for how long this regimen must be persevered in, I think we ought to recommend that those persons who have a strong hereditary predisposition to gout should commence the treatment early, following out its general principles, but having it adjusted to their individual circumstances. As regards the quantity of nutriment to be allowed, it must not be forgotten that in the case of a growing body it is not enough to give merely an equivalent for the daily waste. Still the greatest moderation must be inculcated in such cases, and the stomach should never be overladen. I allow weakly persons that are disposed to gout one or two glasses of good wine, in such cases as a stimulant seems useful or desirable. If an attack of gout or premonitory symptoms of the same supervene, and it is manifest that the development of the disease has taken place, it is easier to induce these patients to give up even this concession. After the symptoms of gout have once clearly appeared, the patient should continue for all his life to live as I have recommended. Such a scheme of life may, in skilful hands, be modified in many ways, but its primary principles must be always adhered to. These are, moderation even in the things that are permitted, no preponderatingly animal diet, and due regard to be had to the use of fats and carbo-hydrates. This is the way to keep the body in general, and the stomach in particular, in the best possible condition. Such a dietary, aiming, as it does, at conserving the body and keeping it from corpulence, will fulfil two other conditions for which the organism disposed to gout must be suited, and the strictest possible adherence to which is essential to it, even after the development of the gouty symptoms. The diet in question will adapt the frame to all sorts of muscular exercises, which in the widest sense of the word should be practised by all who are disposed to gout, and by all gouty patients who find themselves still in possession of bodily

strength. Riding, gymnastic exercises, mountain-climbing, quick walking, hunting, skittles, billiards, velocipeding, and, in short, everything that will harden the muscles must, as I have explained (p. 19) in my remarks on the development of primary articular gout, be diligently practised, for the reason that they promote the movement of the vital fluids, and counteract the tendency to local retentions of the fluids when these are too rich in uric acid.(13) Special directions as to which of these exercises is best for practising the muscles are not necessary, the question being one that depends on such considerations as individual inclination and capacity, differences of occupation, and the actual strength of the affected individual. One restriction must, however, go along with all these exercises—namely, that they must not be pushed to the point of exhaustion. Our patients must not be weakened in condition and constitution, and here, as elsewhere, we have to find the proper medium.(14) I think it not unimportant, as far as this point goes, to add that, according to H. Ranke's observations, a slight degree of bodily activity seems to diminish the quantity of uric acid secreted; while if the activity is great, or carried to the point of great exhaustion, it seems to increase the secretion. But absolute unity of opinion has not been attained by different observers on this point of the influence of movement on the secretion of uric acid.(15) As regards *mental activity*, the training of the mental capacity, I think the same rule holds good as in the case of bodily activity. Exhaustion should be avoided. Due activity of the mental powers up to the level of the capacity of the individual has an enlivening and stimulating effect on the body, provided that physical exercise is not entirely replaced by mental work. If the one accompanies the other, a favourable influence is exerted. Exclusive mental activity, especially if associated with much sitting or exhausting night-work, which weakens the resisting power of the individual, has a prejudicial effect on the course of gout, if not directly, at any rate indirectly, as the indispensable exercise of the bodily powers is neglected. I think it is a faulty method of treatment to set aside at the very beginning muscular

activity in favour of passive manipulation, favourable though the influence of the latter is to the muscular system and the circulation of the fluids. To this category belong rubbing, friction of the body, and massage.(16) Useful and necessary as these things are within certain limits to be defined, still, in the case of gouty patients, active bodily activity must be practised and sought as long as possible. These patients may have their bodily activity assisted by friction, massage, etc., but must never carry this activity to excess. Let "*ne nimis*" be their motto. To keep up the physical capacity of our patients by judicious exercise of the voluntary muscles is one of the leading indications in the treatment of gout. Gouty patients, especially such as like to take life very easily, often think that they can endure much less than they actually can do. It is of great importance to us to make a judicious estimate of this for every separate case, to tear the patient ultimately from his passive condition, and to let him clearly understand that mere abstinence as regards eating and drinking will not always lead to the desired goal.

In conclusion, some remarks must be made on the subject of baths, clothing, and residence.

It is unfortunate that, so far as Germany is concerned, baths are generally employed only for medical purposes. The gouty patient, whose means will in any way allow it, pays a painful visit once or perhaps twice a year to some spa, and thinks he has done enough. In the best case he may occasionally use a bath for purposes of cleanliness; but even this, on account of the difficulty that exists in many places of getting it done, he does not employ to the extent that is necessary or even desirable. Baths and other methods of employing water belong, like proper diet and muscular exercise, to the category of measures which the gouty subject must constantly and diligently adopt. Hydropathy has done much that is valuable in this respect, more especially since it has come to be recognized that the employment of water at low temperature is by no means necessary in all cases, and at all events is not always useful. As soon as we begin to estimate the indications of

the very many different methods in which water may be used as a remedial measure, a whole series of factors must be taken into account, just as in every other question that concerns the treatment of gout. I may mention here the consideration of the individuality, the residence, the capacity for resistance of the affected individual, and the stage of the disease. The experience of the ancients, which has been supplemented as occasion serves by that of the latest observers, teaches us that even cold baths (17) and other cold-water measures are not excluded from the treatment of gout. The less the resisting capacity of the individual is, the further the disease is advanced, the less must be our employment of cold. In a case of primary articular gout, if the kidneys or heart, or both, are affected, the employment of cold must be at once desisted from. In all such cases warm baths must be preferred.(18) Whether any specially favourable influence is exerted by baths and other measures of water-treatment in the case of gout, through the influence that they have on the secretion of uric acid remains still to be shown. E. Pfeiffer (compare my work on "Urinary Concretions," p. 252) has advanced the statement that the secretion of uric acid is diminished by the repeated use of warm baths. A test experiment which I instituted gave, in the case of a healthy man, no diminution of the uric acid eliminated during the course of seven days (*op. cit.*, p. 256). Granting, then, that we were in a position to diminish even constantly by the use of baths the secretion of uric acid, it would still have to be proved that this diminished secretion exercised a favourable influence in the disease, since (as explained on p. 33) the mere diminution of the excretion without further data is not enough to prove diminished formation of the acid.

The clothing of gouty patients must be adapted to the individual circumstances of the patient. Special attention must be paid to the point that the most scrupulous care must be taken to keep the body warm in all weakly cases where increased forbearance is necessary. We should, however, aim in general, as far as the arrangement of the clothes goes, at a carefully graduated hardening. Woollen under-

clothes(19) are necessary, even in the warmest weather, and should be frequently changed, the more especially as they do not show soiling so quickly as others. Special attention must be given to the boots and shoes to be worn. We have already spoken (p. 15) of the prejudicial influences which these may have on the disease. Bad shoes favour inflammatory affections of the feet; and these again, like everything that impedes the circulation, develop or aggravate gout. Besides having well-fitting shoes, gouty people should keep their feet warm, and wear woollen stockings all the year through.

The residence of gouty patients must answer all the expectations that are formed of a healthy residence in general. Most gouty people, belonging as they do to the higher strata of society, either have such a residence or have the means of procuring it. As climatic conditions have, apparently, no direct influence upon the development of gout, seeing that this disease comes under observation in districts of great diversity in this respect, no one need expect to escape it and its ravages by going to a warmer climate, unless at the same time he make the requisite alterations in diet and general conduct of life. Yet a weak, sickly subject, requiring indulgence, one who suffers from severe complications attacking important organs, will find benefit by a residence in a warmer or more uniformly temperate climate, which saves him the horrors of a northern winter, and allows him to move about even during winter in the open air. In any case we should advise even our stronger patients to escape from the turmoil of town life in summer, and go, according as individual circumstances or those of the case dictate, to the country, the seaside, the mountain, or the forest.(20) This is particularly advantageous if such patients are unable during the rest of the year to give that attention to their physical condition which the necessities of the case demand. Sleep(21) often returns, and the functions of the bowels(22) become regular—two points of considerable importance to the gouty individual, who gets along badly when these two functions are not in good working order. Sleeplessness weakens his resisting power, and under the influence of

constipation his digestive powers suffer, not to speak of other inconveniences.

Here I close this work. Its object is simply to give those who suffer from gout, and those who are disposed to it, some advice as to how to live. The nearer they determine to live up to *all* the rules here given, the more benefit will they derive. It is a matter of common sense that the gouty patient can pick out of these rules just what suits him; but he must stick to the proverb, "to do the one thing and not leave the other undone." That as he regulates his life in the way indicated, so will he be able to do without those *attacking** cures, which used to be recommended as prophylactic measures against gout, and are still so employed, though in a somewhat milder form.(23)*

It does not lie within the compass of this little treatise to give the medical treatment or to describe the use of baths in the disease. The beneficial effects of each, however, are far behind those that are consequent on perseverance in an intelligent manner of life. More than two hundred years ago the renowned Sydenham, in his treatise on the gout, expressed his belief that a specific remedy might be found against the disease. Such a possibility may be held by him that is of blissful confidence, but the probability of it is woefully slight (*cf.* p. 6). Sydenham based his hope on the fact that in the Peruvian bark a specific had been found against intermittent fever. Nowadays we know that in the case of gout we have not to deal with a specific infection or contagion, but with a morbid process conditioned by defective tissue-change, and this process depends on a disposition that is perhaps always congenital and inherited. In many cases we may obviate gout and we may assuage it, not, however, through a specific to be devised, but simply on the basis of a mode of life intelligent in every respect.

* Eingreifende.

ADDITIONS AND ILLUSTRATIONS.

(1)* The etymology of the word *gout* is by no means clear. I myself had simply followed Garrod, who, according to the German translation of his work, regards the word *Gicht* as corresponding to the English *gout*, the French *goutte*, etc. Virchow has recently derived the word *Gicht* from the Latin *gutta*, but although *goutte* is undoubtedly derived from that source, and although this derivation agrees with the old ideas that were held as to the origin of gout, yet I cannot allow that *Gicht* comes from the same stem. According to my colleague, Professor Moritz Heyne, who is editing "Grimm's Dictionary of the German Language," *Gicht* is the same as the Anglo-Saxon masculine *gihda* (the *d* in the pronunciation being the same as the English *th*), and the meaning is "bodily pain in general." *Gicht* is thus, properly speaking, a general term, and may be compared to the word *wch* = *woe, pain.*

(2) The question as to the causal relations between lead-poisoning and uric-acid gout is still far from settled. The joint-affections present in lead-poisoning were denoted, at an early period, *arthritis* and *podagra.* If we go back to Cullen we find that he gives three species of his genus *podagra regularis*, to wit, arthritis podagra, arthritis æstiva, and arthritis rachialgica, which last is the same thing as Devonshire or lead-colic, or as arthritis à colica. By this we see that Cullen differentiates the forms of podagra according to their etiological relations. His definition of normal podagra corresponds entirely to the description of podagra in uric-acid gout. He says, in fact, that normal podagra is associated with a rather severe inflammation of the joints, which lasts some days, and disappears gradually, with swelling, itching, and desquamation of the painful part. We see from this, that, apart from the localization of the disease that is expressed by the word podagra, a *special* kind of joint-inflammation is indicated by

* Note by the Translator: This is a discussion as to the derivation and history of the German word Gicht, meaning *gout.* Professor Ebstein has abridged it for me.

the word. The difference between arthritis and podagra had been already clearly defined by Van Swieten in the following terms:—"Inter arthritidem et podagram hoc interest, quod hæc, etsi, cum inveteravit, plures simul aliosque ex aliis articulos occupet, principio tamen pedes solum petat; quod nil tale opinantibus ingruat, nec diuturni esse primi ejus impetus soleant. Arthritis vera febri continua inchoat, torquetque diutius, at plerumque non redit, complures enim, qui gravius hoc morbo laboravere, per omnem deinceps vitam immunes ab eo fuerunt."

Returning from this short digression to lead-gout, we gather from the vivid description which Stoll has given of joint-affections in lead-sickness, that he has had before him in single cases of lead-intoxication a real podagra or chiragra. "In some," says Stoll, "the pain is more in the joints of the fingers, hands, and feet, than in the muscles of the same parts." Still all this does not give us any justification for assuming that in these cases we have really to deal with uric-acid gout. Even Garrod, who first called attention to the concomitance of lead-poisoning and uric-acid gout, expressed himself with such reserve as to the causal relations of both affections, that he may be looked upon equally well either as an opponent or as a supporter of the view that lead-poisoning can cause gout. He says, in fact, "a circumstance which appears to point to the conclusion that lead of itself cannot dispose to gout, is that female lead-workers often suffer from lead-colic, but seldom from gout." Those observers who maintain the connection between gout and lead-poisoning almost all assume as the connecting link between the two an inflammatory affection of the kidneys; in fact, the form that is known as *contracted kidney*. If this be true, we have to deal with a primary kidney-gout (*cf.* p. 13). There remains, however, the possibility that the affections of the extremities, of the muscles as well as the joints, which occasionally occur in lead-poisoning give an impetus to the development of gout, and in such cases we should have to deal accordingly with primary joint-gout.

As I have already said in my book on Gout (*loc. cit.*, p. 158), I have too few data at my command to settle this question.

In my former investigations I depended on information given me by Dr. Jacob, of Lautenthal, in the Hartz. I have collected further materials from Dr. Freymuth, of Grund, and Plümecke, of Zellerfield, in the Hartz district. Dr. Jacob has quite recently made some observations having special reference to the relations between lead-poisoning and nephritis.

I think it best to put the observations of these three gentlemen in a tabular form, and append to this the remarks which they attach to their communications. I had put down a series of questions to be answered with reference to the points that interested me.

Questions put by Me.	Answers by Dr. Plümecke, of Zellerfield. *a.*	Dr. Freymuth, of Grund. *b.*	Dr. Jacob, of Lautenthal. *c.*
(1.) How many of their patients amongst the miners suffer from gout (*arthritis uratica*)?	12	15	3
(2.) How many of these workers are engaged in the lead mines?	7	3	2
(3.) Have they seen gouty affections in their practice in persons who had nothing to do with the mines?	5	11	2
(4.) How many of their lead patients suffer from nephritis or coincident gout?	0	0	7 had nephritis (contracted kidney). None of them had ever shown a gouty symptom.
(5.) Do their gouty patients suffer at the same time from uric-acid gravel?	1	With the attacks of gout, uric-acid gravel almost always observed.	0
(6.) Have they in general amongst their patients any suffering from uric-acid gravel?	4 Of these one had gout at the same time.	0	4

As regards 2*a*, note that the seven lead-workers suffering from gout had repeatedly had lead-colics, and some of them had also saturnine arthralgias and paralyses. Of the three gouty lead-workers in 2*b*, one suffered from paralysis of the extensors of the forearm, and very violent attacks of colic; the second suffered only from attacks of colic; the third had *no* symptoms of lead-poisoning. As regards 2*c*, they have occasionally attacks of gout, but in the intervals are quite healthy; they have had no attack of lead-poisoning for six and a half years, previous to which they had certainly lead-colics, and one of them had also paralysis of the extensors, which he still retains.

As regards 3*a*, the subjects are three women of better position, one teacher, and one civil functionary.

Of the eleven patients mentioned under 3*b*, nine belonged to the Hartz; two of these were women of the miner class. Of the seven native Hartz people, none belonged to the better class; five were forest workers, who were never a winter free from gout, and suffered proportionately more than the miners. The two cases under 3*c* are those of a tradesman and a civil functionary, both of whom were drinkers and stout. Dr. Jacob has seen in Lautenthal eight cases of uric-acid gout in six years, three of which have died.

Under 4*c*, note that of eight nephritic patients six had suffered frequently from lead-colics, and after the cessation of the colics contracted nephritis. The seventh had frequently suffered from lead-colic at a more distant period, and had for this reason been discharged from the lead mines. Only one miner, who likewise had nephritis, had never had anything to do with lead. Dr. Jacob's diagnosis in all eight cases was contracted kidney. None of them had ever suffered from gouty symptoms (attacks of gout, gouty deposits, and so on). Four of them are dead; two died with uræmia. Autopsies unfortunately could not be made. The youngest was 39 years old, the oldest 59; one was 41, one was 43, the rest were 50. The one who was aged 43 came to be treated in the medical clinic of our university, and Dr. Jacob's diagnosis was verified. There was chronic interstitial nephritis, hypertrophy of the left ventricle, with commencing compensation mischief,

paresis of the extensors of the right hand. At an earlier period he had frequently suffered from lead-colics.

As regards, then, the connection between chronic lead-poisoning, uric-acid gout, and contraction of the kidneys, I might formulate my conclusions from these gentlemen's observations thus :—

1. Within the area of observation of these three medical men in the Hartz, gout is a relatively not infrequent disease, and occurs more frequently amongst the lower classes, the miners, etc.

2. At Zellerfield, the number of workers in the lead mines who are affected with gout is exceptionally great. Symptoms of kidney-affection could not be proved by any of the three observers in the case of those gouty patients who suffered from lead-sickness.

3. We may note the frequent occurrence of chronic nephritis (*contracted kidney*) in lead-workers who had repeatedly suffered from symptoms of severe lead-poisoning. A relation between the kidney mischief and uric-acid gout could not be recognized.

The reader must not think that I wish to draw any further conclusions from these few figures than that there is in these known parts of the Hartz a surprisingly great frequency of gout. It is perhaps worth while to call attention to the specially great liability of the lead-workers of Zellerfield to gout. As far as can be concluded from the symptoms present, there is no causal connection here between gout and an affection of the kidneys. I am certainly very near thinking that uric-acid gout occurs oftener amongst lead-workers in the Hartz only because it is found there more frequently amongst the workers in general. I think that we must stick to this principle, that for the development of uric-acid gout in general, as well as in lead-workers in particular, an individual predisposition must be postulated, even though we should grant that lead-sickness, like many other predisposing causes, can give an impetus to the development of primary articular gout. Such an *individual* predisposition must be postulated, for, *cæteris paribus*, only an apparently insignificant fraction of lead-patients suffer from the symptoms of true

uric-acid primary articular gout. In relation to this disposition I have to thank Dr. Andreae for an interesting communication. He practised in Grossalmerode twenty-five years. He noticed that the small number of potters in that place who worked with lead gave him at least as many gouty patients as the rest of the population did. He considered it worthy of note that of eight patients suffering from uric-acid gout, and whom he remembers to be lead-working potters, three (father, mother, and son) belonged to one family. We may certainly talk of a family predisposition to gout in this last case.

As regards the kidney-affection in lead-poisoning, it must at any rate be considered very surprising that Dr. Jacob, within six years, observed seven patients with contracted kidney, and these, with one exception, had frequently suffered from symptoms of lead-poisoning up to the onset of the kidney-disease. As out of the 170 smelters who are under Dr. Jacob's observation only about one-half have the chance of getting lead-poisoning, we can hardly get over the idea that there is a causal relation here, the nature of which, however, it is impossible to state.

It is interesting that none of these nephritic patients have ever had any typical attack of gout, or any other symptom from which it might be concluded with certainty that they had suffered from uric-acid gout. I confess that we cannot say there was no primary kidney-gout in these cases, for urate deposits are often found in the joints at the autopsy, when during life there are neither typical attacks nor any other symptoms of uric-acid gout. This is said to be specially the case with the uric-acid gout of the poor. As regards the etiological element of these cases, it is very easy to think of the influence of the lead. Still, as only a certain number of the patients treated by Dr. Jacob for lead-poisoning were attacked with nephritis, an individual disposition must exist here also, and this may often consist of a uric-acid diathesis.

The non-presence of urate deposits in contracted kidney gives no justification for excluding the development of this form of disease on a gouty basis, for such deposits may be wanting even in the worst forms of gouty kidney. It would

be equally incorrect to conclude, from the non-presence of gouty joint-changes in the dead body, that true attacks of gout have never been present in the affected individual. There could be no more striking proof of this than the affection that led to the death of Professor Cohnheim. He had suffered so far back as 1872 from what were certainly attacks of gout, and in a communication which he sent me, 5th February, 1883, he reckoned he had had about fifteen of these. At the post-mortem were discovered granular kidneys with urate deposits, and an enormously hypertrophied heart, but even the joints that had been most frequently attacked were quite normal in their condition, and showed no deposition of urates (*cf.* Weigert, "Berl. Klin. Woch.," 1884, No. 35, p. 564). From the facts as stated above, it will be seen that the final decision as to the relations between gout, contracted kidney, and lead-poisoning is associated with enormous difficulties. Further experiences are required, and the solution of the problem must be gradually worked up to. My standpoint in the question is, that we cannot entirely dispense with the assumption of an individual disposition, even though we grant a predisposing influence to lead. Leyden has quite recently attempted to establish definite criteria, especially anatomical ones, for the recognition of contracted kidney in lead-disease. Praiseworthy as these investigations are, I think they can scarcely enable us, under all circumstances, to refer to lead-poisoning cases of granular atrophy of the kidney which perfectly resemble those depicted by Leyden. I have found, as a consequence of gout, similar anatomical changes of the aortic system and the kidneys in an individual still young, who certainly never had anything to do with lead. Having shown in my work on Gout that gouty inflammation runs its course without deposition of urates, the death of the affected parts being necessary in order that this may follow, I think that the mere absence of these deposits is not enough to warrant us in rejecting uric acid as a factor in these cases.

(3) Amongst the peculiar views which have prevailed as to the nature of gout, and which have been defended in many circles with the greatest tenacity, I may mention the fact

that even the sexual organs of the individual have been supposed to play a part in the development of gout. More particularly is this the case with regard to the male, for, so far as I know, no one has assigned to the female organs of generation any share in the production of gout. The original propounder of these views was, I think, Van Helmont. He placed the seat of gout in the materia seminalis. According to his view, the gouty germ sleeps there till its awakening, "like the nightingale in its nest." Pietsch considered the universal cause of gout to be a degenerate, ill-formed semen, which is re-absorbed from its vesicle and finds its way back into the blood. Washings of the penis and scrotum accordingly played a part in the treatment of gout. The prescriptions as to the frequency of sexual connection, which were given to the gouty patient, were very rigorous. Costé says in his "Traité pratique de la Goutte" (1768), "Every time that a young man with the gout looks at a woman, he adds a new root to his ailment, and if he is old the same thing will hasten his death." If we give gouty people the advice to be careful and moderate in their sexual relations, and to avoid all forced and artificial excitement, it is simply from the general principle that all weakening influences must be carefully kept from them. The fact that gout is hereditary would seem to show that the number of gouty patients is in some way not normal—a state of things which, however, is not the cause, but a consequence, of gout. From these considerations the gouty individual should learn to have some regard for his descendants, who are not, in the language of Temple, "bene nati," and should therefore be as careful with his regimen in sexual respects as in others.

(4) With regard to the clinical appearances which indicate a participation of the muscles in the gouty process, I shall quote the following communication from Colnheim in a letter to me of 5th February, 1883:—"Perhaps in view of your hypotheses you may be interested to know that my experience, gathered from my own body, is that the most troublesome and longest-lasting sensation, enduring as it does even after the attacks, is that of a high degree of muscular weakness. This is a view which you have given more decided expression

to than any other authority." Sydenham too says, apparently on the ground of his own personal experience, that the sinews of the calf are so drawn with agonizing cramp, that the pain would simply be past human endurance if continued without remission.

(5) We have recently put together a series of figures as to the absolute and relative quantity of uric acid (as compared with urea) which is secreted in the urine of leukæmic subjects. The quantitative estimations were made by Dr. Deichmüller, senior clinical assistant.

1. Frau Areus, 58 years old, taken in 14th December, 1883, discharged 1st January, 1884. Leukæmia lienalis.* Weight, 40·5 kilo. Daily quantity of urine about 1,000 c.c., sp. gr. 1005 to 1010. Urea secreted in 24 hours 13·9 grm.; uric acid, in 24 hours, 1·28 grm. Proportion of uric acid to urea, 1 : 10.

2. August Heidelberg, 21 years, a mason, admitted 13th May, discharged 14th August, 1884. Weight, 58 kilo. Leukæmia lienalis et lymphatica. Urine non-albuminous; daily quantity between 700 and 1,500 c.c. Sp. gr. between 1,016 and 1,020.

Secretion on—	+ U. Total.	− U. Total.	− U. + U. Proportion.	Remarks.
May 16, 1884	20·5	1·98	1:10	Escape on the sediment, 0·87 $\overline{\text{U.}}$
June 1, 1884	21	3·75	1: 5·6	Escape on the sediment, 0·45 $\overline{\text{U.}}$
June 2, 1884	18·97	5·102	1: 3·7	Escape on the sediment, 0·238 $\overline{\text{U.}}$
Average ..	20·15	3·467	1: 6·4	

A secretion in one day of more than 5 grm. of uric acid, which was observed once in the case of this patient, is the largest quantity known to me in any case of leukæmia. Next to it stands the observation of Bartels, who once noted 4·2 in a leukæmic patient ("Deutsches Arch. f. Klin. Medicin," I., p. 23, 1866).

3. Friedrich Bertram, 36 years, gardener, weight 74·5 kilo. Leukæmia lienalis, enlarged lymphatic glands in

* Lienalis = *splenic.*

various parts. Daily quantity of urine at first from 1,000 to 1,700 c.c.; later on as much as 2,000 c.c., sp. gr. 1014 to 1018.

Secretion on—	+ U. Total.	− U. Total.	− U. / + U. Proportion.	Remarks.
May 18, 1884	18·5	3·2	1:5·2	Escape on the sediment, 1·25 U.
May 27, 1884	16·3	2·7	1:6	Escape on the sediment, 1·1 —.
June 5, 1884	15·5	1·9	1:8·1	Escape on the sediment, 0·5 —.
Average ..	16·7	2·9	1:6·4	

4. Conrad Grube, 48 years. Leukæmia lienalis. Admitted 19th July, 1884; discharged improved, 9th August, 1884. Weight, 71·5 kilo. Daily quantity of urine at first varied very much, between 750 and 1,750 c.c.; later on was constant, between 1,500 and 1,750 c.c. Sp. gr. between 1017 and 1020.

Secretion on—	+ U. Total.	− U. Total.	− U. / + U. Proportion.	Remarks.
June 22, 1884	30·5	1·232	1:24·7	Escape on the sediment, ·523 U.
June 25, 1884	28·22	0·923	1:30	0. Urate sediments copious at first, but disappeared entirely from July.
Average ..	29·36	1·077	1:27·3	

The following table may be constructed from the figures in these four cases.

	+ U. Total.	− U. Total.	− U. / + U. Proportion.	
Case 1	13·0	1·28	1:10	
Case 2	20·15	3·467	1: 6·4	Averages.
Case 3	16·7	2·9	1: 6·4	
Case 4	29·36	1·077	1:27·3	

In none of these patients could clinical symptoms be demonstrated, from which implication of the medulla of bones could be inferred; but, for all that, this is by no means excluded.

In our cases the amount of uric-acid secretion was in inverse proportion to the general bodily strength.

(6) As lymphatics arise everywhere in the connective tissue, the sap-canals of this being simply the radicles of the lymphatic vessels, we can easily understand why in the case of uric-acid gout we have here blockage of the fluids overladen with uric acid. We have no need, in order to elucidate these processes, to locate the formation of uric acid in the connective tissue. In consequence of such blockage in the lymphatics, extensive lymphangioitis with rosary-shaped extensions of the lymphatics in the extremities may be developed. This fact a gouty colleague of mine had repeatedly occasion to observe in his own person. I mention this because the right explanation of these things might cause great difficulties. In the patient in question the processes in course of time underwent a retrograde transformation. From the implication of the lymphatics in the gouty process, we can also understand that in gouty inflammation of the kidneys the deposits of uric acid do not appear exclusively in the tubuli uriniferi, but also frequently in the interstitial tissue of the kidneys after causing the death of the tissue. Pedell has recently added another case to those mentioned in my book on Gout. The close aggregation of the cellular tissue and of the lymphatic vessels in the papillæ of the kidneys explains how it is precisely in this part of the kidneys that the gouty foci—really small gouty *tophi*—are established.

(7) Vegetarianism has not wanted sturdy defenders in gout. The Pythagorean formula—(1) pisa et olera ;* (2) olera et pisa ; (3) olera cum pisis ; (4) pisa cum oleribus—has been specially applied to this disease. According to Reveillé the chief ingredients in the diet of the gouty should be vegetables of the cabbage kind, ripe fruits, and farinaceous substances of good quality, amongst which he puts potatoes in the first rank. These and such-like teachings do not, however, satisfy modern conceptions as to a scientific dietary of gouty patients.

(8) In spite of the slight choice of dishes that are allowed, uniformity of diet, as giving the patient a disgust at eating,

* Pisa = *peas ;* olera = *greens* or *cabbage.*

must be very carefully avoided. The different sorts of animal food, the different ways of preparing the same, and the great variety of vegetables, make this an easy task.

(9) Naturally, the number of meals may be increased if the condition of the digestive organs calls for it, as, for example, when the stomach is not able to bear a larger meal than usual at once—such a one, for example, as dinner.

If necessary, we may fall back on milk in individual cases, but to recommend it as curative in gout should commend itself to nobody nowadays, although there have been observers who thought that nothing was better for gouty patients. This point has evoked very lively discussion, and there is a goodly quantity of literature on the subject. As the exclusive use of milk is not specially adapted for the healthy adult, so we may say at once that it is not so for the gouty either. Milk-cures for gout may be considered as abandoned. Beneke considered that whey-cures were indicated in gout from a theoretical standpoint, on account of the increased uric-acid formation, but in practice, so far as I know, they are not extensively used.

(10) Similarly, with regard to the use of condiments we find many contradictory opinions amongst writers. Falconer, although he does not advise immoderate use of condiments, allows the moderate use of vinegar, which A. von Haller signalizes as *salubre omnino et condimenti genus et denique potus* ("Elem. Physiol.," vol. vi.). Nor does Falconer exclude mustard; but Cadogan rejects both it and salt.

(11) Absolute prohibition of wine in gout is not justified. Patients up in years frequently cannot bear entire withdrawal of their wine; and if we wish to avoid undesirable cases of collapse, we have to be very cautious even in reducing their daily quantum to the lowest possible limit. I have already said that in the manifold conditions of weakness in which gouty patients find themselves, wine cannot be withdrawn. I might express myself in similar terms about beer. Beer may be allowed in small quantities, not for pleasure, but as a nourishment or stimulant.

The question what sort of wine to drink is not difficult to answer after what has been said. Champagne is, for good

reasons, in universal disfavour among authorities. In the choice of alcoholics Mooren has given the preference to those which least increase the acidity of the urine. He found that Dortmund beer did this least of all. Good Rhine wine increases acidity much more; so do selected sorts of Moselle, and good Bordeaux that has been laid down some time; most of all, perhaps, the ordinary qualities of Moselle. Good pure brandy, if a powerful stimulant is required, may be used under medical supervision in small quantities. As soon as alcohol, however, is no longer necessary, its use must be dispensed with.

(12) This opportunity may be taken to fix some points with regard to the use of non-alcoholic drinks in gout. Bontekoe (quoted by Barthez) asserted that the habitual use of tea by the Chinese was the reason why neither stone nor gout existed in that country. Though this cannot seriously be maintained, yet tea is to be preferred to coffee as more suitable for the stomach. The rule given by Reveillé, that gouty people should take coffee if they are stout and corpulent, and have no excessive nervous irritability, if they are not over-heated or costive, or if they have been long accustomed to the use of it, is not sufficiently supported by observation. We may here remark also, that there are isolated cases in which, through some idiosyncrasy, tea cannot be taken. Such individual characteristics have to be taken into account.

(13) Bodily exercises, active and passive, might be supposed to be specially useful in cases of primary articular gout, seeing that they act directly against that retention of the fluids (p. 20) which favours the deposition of uric acid. The same result follows from a series of observations which find their expression in the questions which Hasse set himself to answer. These questions are—How are cartilages, bones, and cellular tissue penetrated by the elements that nourish them, and freed from their waste products? also, what power sets these fluids in motion? For a reply to these questions, he takes the standpoint of comparative anatomy. Along with the propelling power of the heart and the action of the respiratory muscles, the whole of

the muscles, striped and unstriped alike, contribute to the movement of the blood and lymph. In the case of cartilage, for example, the expression of these elements is secured by the small canals and intervening spaces of the soft perichondrium that surrounds them. Muscles with their fascia take a support from this perichondrium, or are directly or indirectly attached to it. We thus see that systematic strengthening and exercise of the muscles are of powerful assistance from this point of view also in checking the development or advance of gout.

As far as the promotion of the circulation is concerned, the object of these exercises is not merely to facilitate the reflux of venous blood, but specially to direct the movement of the fluids in the fine lymphatics, into which fall the waste products of tissue-change formed in the muscles and bone-medulla.

(14) Sydenham insists that the movements of gouty patients should not be carried to the point of exhaustion. He recommends daily exercise to a moderate amount. He prefers riding, and riding is an exercise that is in general suitable. Warner, too, besides rubbing and brushing of the affected joints, recommends a morning ride in summer of two to three hours, followed by a second in the evening during the same season. If riding is unsuitable either through old age or other causes, Warner recommends gouty patients to drive, but they should have the springs of the carriage taken out, and fall back upon leather straps as a substitute. Cadogan's advice, "Remedium in motu quaere sudando," has also its limits. A certain amount of tiredness must not be exceeded. Of course, bodily exercises must always be accompanied by strict regimen and frugal habits. Those bodily exercises are specially to be recommended in which the mind is pleasantly occupied. Of such we may call special attention to skittles and billiards, as also to hunting. For military men who are threatened with an attack of gout, there is no better preventive than the exercise required in attending one of the military manœuvres.

(15) Hammond ("American Journal," Jan., 1855) observed a diminution of the uric-acid secretion to result from active movement, and the greater the exercise the greater was the diminution. Genth and Fl. Heller ("Heller's Archiv")

observed an increase of the uric-acid secretion after active movement. Eckart found (1) that after prolonged rest there is a diminution of the uric-acid secretion, and at once an accumulation of it in the blood, in consequence of which he observed a sudden attack of gout in the case of a patient; (2) that movement and bodily activity prevent uric acid being formed in excess in the blood; and (3) that in consequence of active movement there is not merely a simple increased secretion of uric acid, but a more vigorous transformation of uric acid into urea. Eckart deduced these principles and conclusions from quantitative estimations of uric acid. As he did not, however, use the whole quantity of urine passed in a day, but only 300 c.c. of it, I do not think his experiments conclusive. The same remark applies to experiments of Eckart's in which he attempted to show that the secretion of uric acid in the urine is diminished by inhalations of oxygen.

(16) *Dry* rubbings with flannel, in spite of the greater vogue nowadays of moist applications, deserve a special trial in the case of weak patients with little resisting power, who require to be carefully managed. The idea of these is found as far back as Celsus. Amongst the ancients the art of friction was highly developed. Although what Philagrius (quoted by Aëtius) states is not correct, viz., that friction alone will save gouty individuals from fresh attacks whatever their errors of diet may be, yet Boerhaave's statement has much more to recommend it. He advises gouty patients to give themselves a good rubbing night and morning with dry flannel, especially over the joints; not merely do they feel easier after it, but they may protect themselves from a recurrence of the attacks. I do not think Boerhaave is right in stating that gout never attacks people with sweaty feet. Van Swieten advised rubbing as a substitute for active motion. Weak patients may be rubbed softly with the hand; others may be rubbed with a big brush, the hardness or softness of which may be accommodated to the effect desired and the tenderness of the skin. It is best to rub in the direction of the hair growth. There are patients, however, who cannot bear it, and they must be gradually accustomed to it.

These rubbings must be continued till the skin is red; when the point of pain is reached they must be discontinued for the time.

Reveillé has given prominence to the use of *massage* in gout, which began to be practised in Frankfort about the end of the year 1830. He admits, however, that if pushed to excess it may cause harm, and pains in the muscles and joints. I myself have recommended, in my work on Gout, the employment of massage in the intervals between individual attacks. Reibmayr says with reference to this recommendation of mine, that its success cannot be very encouraging, as the affection rests on a constitutional basis, and a relapse may easily upset any good derived from massage. As regards the kind of massage to be used, Reibmayr is certainly right in saying that the fact of gout being a constitutional disease is detrimental to the success of these as of all other measures in gout; nevertheless they are not to be despised as supplementary aids. Massage, again, must not be allowed to take the place of active muscular movements. The introduction of gymnastic apparatus, in which the patient may exercise himself in a sitting position, and in which these exercises are adapted to every joint and every condition of strength, is of great value to weak patients. Such apparatus is to be found in Friedrichsbad in Baden-Baden (*cf.* Heiligenthal, "Literary Index," No. 26).

(17) Cold baths were considered useful even in antiquity, as we find in some passages of Strabo and Pliny, which mention the cold water of the fast-flowing Cydnus as useful in gout. Scudamore has recommended douches and cold-water washings as preservative against gout. The body should be immediately covered with warm flannel. Friction should be used with or after the cold water. Reveillé has given the following definite indications for the use or prohibition of cold baths in gout:—(1) They are to be allowed if the patients are young, and if a feeling of warmth and comfort follows the bath; (2) during a paroxysm they should not be used [I may state that Pietsch has attempted to show, in a series of observations, that cold baths are useful even in the paroxysm]; (3) results must be allowed to speak for their use; (4) the season must be favourable. Ofterdinger

lauds (amongst prophylactics) baths, especially river and sea baths, except in cases of deficient bodily activity, or in advanced age, where the joints are very stiff. The advantage of sea baths is often evident in cases of persons with moderate gouty tendency, should this advantage not be destroyed by luxurious living, as is too often the case in bathing resorts. Quite recently, Küster has proved the favourable influence of cold-water methods by experiments on himself and others. He had a cold splash every morning as soon as he left his bed, and then rubbed his body with a rough bath-towel.

(18) As regards warm baths, observers here also are not agreed. This is easily accounted for, seeing that hydrotherapeutic measures should be ordered not merely according to individual circumstances, but specially according to the stage at which the disease has arrived. In the case of warm baths it is necessary to notice that they should be used by patients in the same house as they live in. On this account the arrangements to be had at Wiesbaden are particularly praiseworthy. Warm baths have not merely a curative, but also a prophylactic significance in the treatment of gout. In this way baths and drink-cures may be combined with one another, and may be specially used along with douches, gymnastics, and massage in order to ameliorate the gout as a constitutional ailment, and defer, or even prevent, the outbreak of new attacks. The necessary details may be found in Pfeiffer, "Die Trinkkur in Wiesbaden," Wiesbaden, 1881; Pfeiffer's "Balneologische Studien über Wiesbaden," Wiesbaden, 1883; Beissel, "Balneologische Studien mit Bezug auf die Aachener und Burtscheider Thermalquellen," Aachen, 1882, p. 69; Beissel and G. Mayer, "Aachener Thermalkur und Gicht," "Berl. Klin. Woch.," 1884, No. 13; Frey und Heiligenthal, "Die heissen Luft- und Dampfbäder in Baden," Leipzig, 1881. Similarly, other thermal baths may be employed, as Wildbad (*cf.* "Literary Index," Nos. 45 and 46) and a number of similar *cure-places*.

(19) Warm clothing, but not too much of it, is recommended by all doctors. The material which, above all others, is suited to subdue gout, and more particularly to prevent it, is, as Reveillé remarks, flannel, which some one justly calls

a clothing with god-like qualities. In summer it may be the wisest plan to wear old flannels. Woollen underclothing has long been recognized as of value.

In the recognized handbook of military hygienics, by Roth and Lex (vol. iii., p. 83), we read: "In spite of all inconveniences which the use of woollen shirts may entail, they are indispensable to the soldier on account of their capacity for moisture, and as bad conductors of heat."

If the soldier has also disproportionately greater fatigues to overcome than the gouty subject has under ordinary circumstances, yet slight injuries inflict precisely as much damage in the case of the gouty as considerable ones do in the case of the soldier. The usefulness of woollen underclothes has been considerably advanced in late years by improved methods of manufacture.

(20) Change of air has been credited with many good results in the prophylaxis of gout. Warner, a clergyman, who himself suffered from gout, ascribes two of his very worst attacks to bad air; he advises gouty people, as soon as they notice the approach of a gouty attack, to go to the country. Sydenham too, and others, have mentioned the influence of good air in gout. It is difficult to say what influence better air has of itself on gout. We can only say that, as a rule, the general hygienic conditions cannot be made too favourable for gouty patients, and thus residence in a good atmosphere may be an important factor. It need merely be indicated here that residence in the country, with mountain air, etc., generally brings into play a series of other favourable influences.

(21) As regards sleep, we may note that both too much and too little sleep are unfavourable to gouty patients. In particular should patients who have a disposition towards gout, and those actually ill of it who are tolerably strong, not indulge in too long sleep. The patient in any case should have as much sleep as will maintain his strength, and regard must be had to the actual necessities of the case. Sydenham condemns late sitting at night, and advises early going to bed, especially in winter.

Ofterdinger's advice carries with it much that is worthy of consideration: "Much sleep is not good, but prolonged rest,

covered up in bed, is beneficial to all gouty subjects, and such as have had several severe attacks." Sleep in the daytime is in general unadvisable. Mattresses and blankets are almost always to be preferred to feather beds, except in the case of old and decrepit patients, who have been accustomed to a softer couch from their youth. The hardening treatment should be tried with this as long as it is possible. Küster sleeps in an unheated room, with one of the upper windows often left open even in the depth of winter to admit fresh air (*cf.* Note 17).

As to the treatment of sleeplessness, from which many gouty patients suffer owing to different causes, scarcely any general rules can be given. Each case must be treated on its own merits. Musgrave thinks rubbing with a soft hand will procure sleep and lessen pain. Avoid drugs to procure sleep, such as morphia, chloral hydrate, and large doses of bromide of potassium. These should only be used if the pain is too great to be bearable, and cannot be subdued in any other way.

(22) The regulation of the bowels in gouty patients, who suffer so frequently from constipation, is made more easy by the regimen here recommended. Grant, quoted by Barthez, long ago called attention to the fact that the best means of regulating the bowels was a moderate regimen with vigorous physical exercise, and if supplementary aid was required he gave four to eight grammes of flowers of sulphur every evening in a little milk. In the case of children with inherited gout, who suffer from flatulence and indigestion, he combined magnesia with the prescription. I have carefully avoided purgatives, and in any cases where diet or the use of fruit has not sufficed to regulate the bowels, have recommended injections to be used. In such cases the syringe should be used daily whether there is a motion or not, and the best time to use it is just before getting up in the morning. The result is generally either a permanent cure or marked improvement of the constipation. The fluid I use is a 1 per cent. solution of common salt, at a temperature of 70° to 80° Fahr., and the quantity $\frac{1}{4}$ to $\frac{1}{2}$ litre. No great force should be used in injecting it. When the fæcal masses are very hard, a Hegar's

funnel should be used at night to inject some castor oil, which may be made up in emulsion with gum-arabic.

In this way the energies of the digestive canal are conserved, we attain our end in the easiest and surest fashion, and are soonest in the position to restore the normal activity of the bowel.

(23) Of old times, in order to obviate the gout, very drastic cures were in vogue. The idea was to remove the *materia peccans*, either through stimulating the natural secretions or by withdrawing fluids from the organism of the patient. Elias Anhart, in his "Consilium Podagricum," recognized a yearly *evacuatio*, along with right diet and exercise, as the three things in which the cure of gout was to be sought.

The sweat-cures are the relatively mildest of these methods. Boerhaave recommended spirits of hartshorn to be taken every morning, and a woody infusion every night, for three months. Quarin (*loc. cit.*, p. 288) thought the recurrence of the attacks could be prevented by the administration of definite drugs at definite times, by means of which the activity of the skin and bowel was to be stimulated. For this purpose he used elder flowers, sulphur, guaiacum, and antimony. Others tried to get the peccant material ejected through the urine; and the means they used for the purpose were not always harmless. Martius (see Barthez) made a patient, whose attacks often lasted six months, take, at every change of the moon, eight fruits from the Winter-cherry (*Physalis alkekengi*), and this was said to carry away some very rotten stuff from the system. To the last-named category belongs the use of setons or issues as a favourite means of preventing gout, as well as repeated venesections from time to time. Stisser gives a warning against venesections and laxatives employed in spring and autumn with a view of modifying the attacks. The temporary use of drastic purgatives was also recommended. Sydenham was one of the first to reject venesection and purgation. Nowadays all these means have fallen into disuse, and justly too, for their benefits are problematical, and the harm they do often too evident. The more sensible the habit of life is, the more easily can every sort of treatment by removal be dispensed with. The patient is also in a position better to maintain the activity of his

organs and the strength of his body. If the gouty subject follows the advice of Sir William Temple (p. 26) he will not require to flush out his system by increasing his quantity of drink, either by taking inordinate quantities of water, by indulging in wonderful combinations of different kinds of tea (which used to be a favourite plan), or by drinking those natural or artificial mineral waters which are nowadays so common. As regards increased water-drinking, which has found so many advocates up to the most recent date, I may mention the recommendation of Cadet de Vaux—who, *horribile dictu!* condemned the wretched patient to drink every hour 180 to 240 grammes of warm water, at 120° to 140° Fahr., until he had taken about 12 litres in as many hours. The mere fact that many people can stand even this amount gives us no right to recommend so nonsensical a plan, modified though it has been, and still finding some friends to recommend it. I have said plainly enough (p. 32) what I think of the use of water as a drink in gout. As regards drinking water, Von Renz very justly remarks: "Flushings of the system with hot water I do not care for, and I speak from experience." All means of this class, as far as we have to deal with them in general, nowadays, should only be thought of if the patient has not carried out his regimen long enough or carefully enough, or if the gouty tendency is too strong to be subdued in a simple and natural way (although I think that in such circumstances only strengthening means should be appealed to), or finally, if, in consequence of the gouty process, complications have occurred requiring special aid. Under these circumstances the well-known spas deserve first mention, but in this place, having only to deal with regimen, I shall not go further into their merits. Here, too, I may utter a warning against excess. Von Renz says severely, but with justice ("Literary Index," No. 45, p. 64): "There are some kidney and bladder washers that I could name, as regards whose prescriptions I could wish, in the interest of the patient, that the pre-Aristotelian anatomy were right, which maintained that the water which was drunk found its way by distinct channels to the kidneys, there to be filtered through in the shortest possible time."

THE LITERATURE QUOTED.

(Alphabetically Arranged.)

Besides referring to my own writings—"Die Natur und Behandlung der Gicht," Wiesbaden, 1882; "Die Natur und Behandlung der Harnsteine," Wiesbaden, 1884; "Die Fettleibigkeit (Corpulenz) und ihre Behandlung," 6 Auflage, Wiesbaden, 1884,—I have made use of the following works:—

1. Anhart, Elias von Graetz aus der Steyermark "Consilium podagricum d. i. Wie man sich vor dem Podagra hüten / oder in Zeit dieser Krankheit curiren und trösten soll / allen Lagen so Podagrisch sein / zu Gutem gestellt." Erffurdt, 1614. (Another edition, Ingolstadt, 1631.)

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